PROCEEDINGS OF THE CALIFORNIA ACADEMY OF SCIENCES

Volume 61, No. 4, pp. 291–379, 13 figs., 1 table, Appendix March 31, 2010

Catalog of Guatemalan Acanthaceae: Taxonomy, Ecology, and Conservation

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This revision of Acanthaceae in Guatemala recognizes 25 genera with 124 species as native to that nation. Sixteen species (13% of native species) are endemic to Guatemala. Four additional genera and seven species have escaped from cultivation and become naturalized in Guatemala. More than 60 changes to the treatment of the family in the *Flora of Guatemala*, published in 1974, reflect taxonomic renovations, recently described species, and new distribution records. Here, a new species of *Justicia* (*J. velizii*) is described from Izabal and Petén, *J. macrantha* var. *piliformis* is elevated to specific rank as *J. williamsii*, and two new combinations in *Stenostephanus* are proposed (*S. azureus* and *S. ruberrimus*). This account includes original descriptions of 25 species (including most endemics); information on flowering and fruiting periods and distributions within Guatemala; conservation notes for rare and endemic species; and taxonomic, nomenclatural, and/or morphological notes as appropriate. New typifications are discussed and/or proposed for *Mendoncia lindavii* and *Ruellia stemonacanthoides*.

La presente revisión de Acanthaceae en Guatemala reconoce 25 géneros con 124 especies como nativas en esa nación. Dieciséis especies (13% de las especies nativas) son endémicas a Guatemala. Cuatro géneros adicionales y siete especies se han escapado de cultivo y se han naturalizado en el país. Más de 60 cambios al tratamiento de la familia en la *Flora of Guatemala*, publicada en 1974, reflejan renovaciones taxonómicas, especies recientemente descritas y registros nuevos de distribución. Aquí, una especie nueva de *Justicia* (*J. velizii*) se describe de Izabal y Petén, se eleva *J. macrantha* var. *piliformis* al nivel de especie como *J. williamsii* y se proponen dos combinaciones nuevas en *Stenostephanus* (*S. azureus* y *S. ruberrimus*). Este trabajo incluye descripciones de 25 especies (incluyendo la mayoría de especies endémicas); información sobre épocas de floración y fructificación y distribuciones dentro de Guatemala; notas sobre la conservación de las especies raras y endémicas; y notas taxonómicas, nomenclaturales y/o morfológicas cuando es pertinente. Se discuten y/o se proponen tipificaciones nuevas para *Mendoncia lindavii* y *Ruellia stemonacanthoides*.

Guatemala occupies a region particularly rich in Acanthaceae but inadequately collected in recent decades. The following catalog of Guatemalan Acanthaceae updates the account of the family in the *Flora of Guatemala* (Gibson 1974). With the completion of this flora in 1977 and political unrest in the country during the last quarter of the twentieth century, relatively little international botanical activity was undertaken in Guatemala for several decades. However, activities of Guatemalan botanists and collectors since 1980 have resulted in the growth or establishment of at least four significant herbaria in Cd. Guatemala: AGUAT, BIGU, USCG, and UVAL. These important collections contain many unique taxonomic and geographic records. Studies in these and other herbaria, combined with numerous monographic (e.g., Daniel 1983, 1986, 1988, 1990a, 1991a, 1991b, 1995c, 1999b) and floristic (e.g., Daniel 1995b, 1997a, 2001, 2005) studies of Acanthaceae that include plants in Mexico and Central America, have resulted in the reevaluation of numerous species that either occur in or are endemic to Guatemala. This account has the following goals: 1) to study Guatemalan Acanthaceae anew and in the context of recent taxonomic and phylogenetic work on the family; 2) to provide an updated/revised listing of Acanthaceae that are documented from Guatemala; 3) to provide data on the distribution and ecological preferences of each taxon within Guatemala by indicating the departments from which collections of each species have been taken and by listing habitats, elevations, and flowering times for each species based solely on Guatemalan collections; 4) to describe/document taxonomic novelties and new distribution records; 5) to provide updated descriptive, nomenclatural, and conservation information for all Guatemalan acanths that are either endemic to the country or have not been treated recently (e.g., in Daniel 1995b, 2005; Durkee 2001); 6) to indicate one or more recent sources for descriptions of all other Acanthaceae occurring in Guatemala; and 7) to provide an aid for the collection and distribution of specimens of Guatemalan Acanthaceae so that they are better represented in herbaria. While Guatemalan Acanthaceae will be treated in a forthcoming volume of the *Flora Mesoamericana*, that account will not focus on plants in Guatemala, nor will it include many of the taxonomic, nomenclatural, geographic, or conservation details noted here.

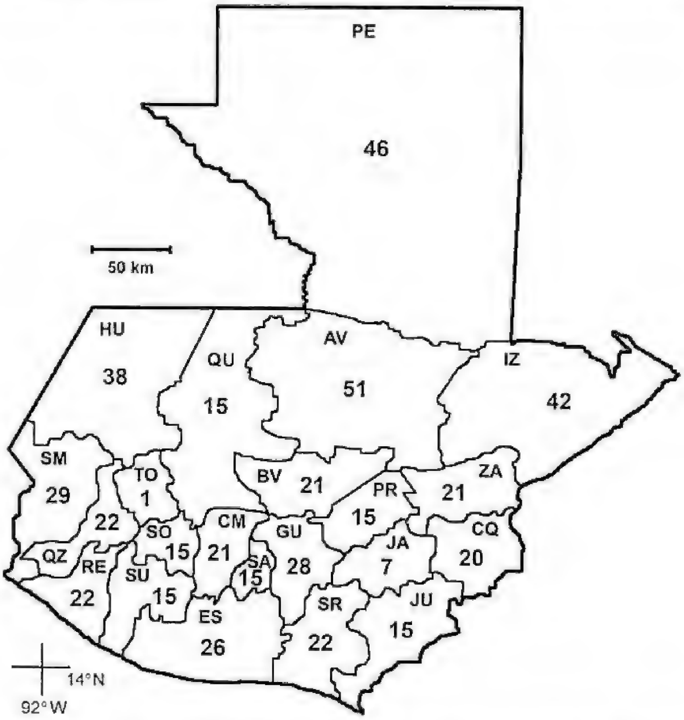


FIGURE 1. Map of Guatemala showing departments and numbers of native species of Acanthaceae in each. AV=Alta Verapaz, BV=Baja Verapaz, CM=Chimaltenango, CQ=Chiquimula, ES=Escuintla, GU=Guatemala, HU=Huehuetenango, IZ=Izabal, JA=Jalapa, JU=Jutiapa, PE=Petén, PR=El Progreso, QZ=Quezaltenango, QU=Quiché, RE=Retalhuleu, SA=Sacatepéquez, SM=San Marcos, SR=Santa Rosa, SO=Sololá, SU=Suchitepéquez, TO=Totonicapán, ZA=Zacapa.

With an area of about 108,890 square kilometers, Guatemala (Fig. 1) is the third largest among the seven Central American nations. Estimates of the number of vascular plants there vary from about 8,000

(Davis et al. 1986) to 8,691 (Goombridge and Jenkins 2002). The number of species endemic to Guatemala is often given as 1,171 (e.g., Davis et al. 1986; Goombridge and Jenkins 2002). A total of 8,436 native vascular plants was calculated from data provided by Véliz (2008). He noted only 538 species (apparently also including nonvascular plants) as endemic to Guatemala. Because this number of endemics appears to be underestimated (e.g., the number of endemic Acanthaceae is listed as zero, and his table of the number of endemics for the 20 largest families of vascular plants totals more than 600), I suspect that the number of endemics is closer to 1,000.

Acanthaceae are among the 20 largest families of flowering plants in Guatemala (Véliz 2008). Gibson (1974) recognized 123 species (23 endemic to Guatemala) in 33 genera (one, *Megalostoma*, endemic to Guatemala) as native to the country. She also treated additional species that either were known only from Belize (e.g., *Louteridium chartaceum* Leonard) or that might be expected to occur in Guatemala (e.g., *Stenostephanus silvaticus* (Nees) T.F. Daniel, as *Habracanthus silvaticus* Nees). Newly discovered taxa, reevaluated taxa, new distribution records, and numerous taxonomic and nomenclatural changes resulting from studies of Acanthaceae in Mexico and Central America during the past 30 years have resulted in more than 60 changes to Gibson's account. For example, several genera recognized by Gibson (1974) are now treated as congeneric with other genera (*Teliostachya* and *Lophostachys* = *Lepidagathis*; *Buceragenia* = *Pseuderanthemum*; *Chaetothylax*, *Neohallia*, *Megalostoma*, and *Siphonoglossa* = *Justicia*; *Trybliocalyx* = *Chileranthemum*; *Hansteinia* and *Habracanthus* = *Stenostephanus*; *Averia* = *Tetramerium*; *Blechum* = *Ruellia*).

METHODS

This revision is based on focused field studies in Guatemala during 2009 and 2010, and studies of all herbarium specimens of Guatemalan Acanthaceae at the following herbaria: AGUAT, BIGU, CAS, DS, DUKE, F, MO, MICH, TEX/LL, UC, US, USCG, and UVAL. Additional collections from Guatemala were examined at A, BM, G, GH, K, L, M, NY, P, PH, POM, RSA, S, and UPS. Morphological data for keys and descriptions in the taxonomic catalog below are derived from the herbarium collections. Where a recent description is available, and concurs with Guatemalan plants, a reference to it is provided. When a recent description is either unavailable or when Guatemalan plants depart significantly from a recent description, an original description is provided. New and comprehensive descriptions are provided for most of the species endemic to Guatemala. In the following species accounts, the description (or reference to a recent description) is followed by the known flowering and fruiting periods of Guatemalan representatives of each species based on the presence of flowers or fruits on herbarium specimens. These phenological data are followed by ecological information based on notes from labels of Guatemalan collections and personal observations. Sadly, comprehensive and/or precise ecological data (especially biotic community or communities of occurrence) seldom are found on collection labels of Guatemalan Acanthaceae. In order to provide some indications about the communities and habitats in which Guatemala Acanthaceae grow, those data available are listed here under "habitats," along with the known elevational ranges. These data (except as noted) pertain only to the species as they occur in Guatemala. The communities (where known) are listed first in a sequence from wetter to drier; these are followed by the local habitats and elevational range. Local names and uses (if any), usually based on collection notes, are followed by a listing/documentation of collections by department in Guatemala. Usually only a single collection per department is listed and specific localities are provided only for some of the rare taxa. All types derived from Guatemalan collections are noted. In several instances, Gibson (1974) indicated occurrences in departments from which species were not seen during my studies. These potential discrepancies are noted in the discussions.

In some instances, she might have seen materials that I did not, but most such purported occurrences are based either on misidentifications or different taxonomic interpretations. Discussions also include information on morphological variation, taxonomic interpretations, nomenclature, distribution, and conservation status. Photographs of flowers representing numerous Guatemalan Acanthaceae are provided to highlight the morphological diversity of floral form in the family and as an aid to identification. Scanning electron micrographs of pollen, where available, are shown for all species native to Guatemala, unless images of them have been published elsewhere. Acanthaceae are the most eurypalynous of all flowering plant families, and pollen grains are often diagnostic at generic or specific ranks. A special effort was made to image pollen of Guatemalan endemics. The only endemic species of Guatemalan Acanthaceae for which pollen remains undocumented is *Justicia steyermarkii*. Images of pollen for native Guatemalan Acanthaceae not provided herein can be found among the references cited (e.g., Gibson 1972; Daniel 1998). Several collections of Guatemalan Acanthaceae that cannot be identified with certainty are discussed under species to which they appear most similar.

Summary of Results

Taxonomic richness, diversity, and endemism. Recent herbarium and field studies document the native or naturalized occurrences of 131 species in 29 genera in the country (Table 1). Of these, 25 genera with 124 species are native to Guatemala. Although no genera of Acanthaceae are restricted in distribution to Guatemala, 16 species (13% of the native species) of the family are endemic there: *Dicliptera debilis*, *D. guttata*, *Justicia gibsoniae*, *J. neomontana*, *J. pedicellata*, *J. sangilensis*, *J. silvicola*, *J. steyermarkii*, *J. velizii*, *J. viridescens*, *J. williamsii*, *Odontonema steyermarkii*, *Poikilacanthus pansamalanus*, *P. skutchii*, *Stenostephanus azureus*, and *S. ruberrimus*. These numbers are somewhat higher than previously reported by Daniel (2005) because new taxa are still being discovered in Guatemala (e.g., Daniel 2007; Daniel and Véliz 2009), especially in species-rich regions that are not well collected (e.g., Cerro San Gil; *cf.* MacVean and Davidse 2007). Comparison of these numbers with those of other regions of Mesoamerica (Daniel 2005) reveals that 1) Guatemala has more species of native Acanthaceae than any other Central American nation; 2) it has fewer endemic species than either Costa Rica (38 species; 31% of the native species) or Panama (21 species; 19% of the native species); 3) the numbers of native species and endemic species are virtually the same as encountered in the Mexican state of Chiapas to the north and west; and 4) Guatemala has about 1.7 and 2.1 times the number of native species of Acanthaceae known from the largest Central American nations, Honduras and Nicaragua, respectively. The relative richness of Acanthaceae in Guatemala is likely enhanced by: the relatively large size of the nation; the diversity of intact biotic communities, varying from wet (e.g., lowland and montane rain forests) to dry (e.g., thornscrub and tropical deciduous forests), that span elevations from sea level to more than 4200 m; proximity to nearby regions with considerable species richness (e.g., Chiapas) or with unusual/uncommon habitats (the Yucatán Peninsula of Mexico); a long and diverse geological history (cf. Steyermark 1950); and past collection activities that have documented much of the flora.

The status of Acanthaceae in Guatemala is perhaps better known than that in other Central American nations with similar numbers of species (e.g., Costa Rica, Panama) for several reasons. These include the existence of Gibson's (1974) excellent account of the family in Guatemala and recent surveys/studies of Acanthaceae in each of the political units adjacent to the country (i.e., Chiapas, Daniel 1995b; Belize, Daniel 1997a; El Salvador, Daniel 2001; Honduras, Daniel 2005; Tabasco, Cowan 1983; and Mexican states of the Yucatán Peninsula, Daniel unpublished). Based on their occurrences in surrounding regions, where they occur in habitats that also are found in Guatemala, the following species could occur (or might have once occurred) in the country: *Avicennia bicolor* Standl., *Carlowrightia hintonii* T.F. Daniel, *C. myriantha* (Standl.) Standl., *Dyschoriste hirsutissima* (Nees) Kuntze, *Holographis websteri* T.F. Daniel, *Justicia ensiflora* (Standl.) D.N. Gibson, *J. laevilinguis* (Nees) Lindau, *J. tuxtlensis* T.F. Daniel, *Nelsonia canescens* (Lam.) Spreng., *Staurogyne agrestis* Leonard, *Stenandrium chameranthemoideum* Oerst., *Stenostephanus glaber* (Leonard) T.F. Daniel, *S. gracilis* (Oerst.) T.F. Daniel, *S. silvaticus* (Nees) T.F. Daniel, and *S. tacanensis* (Acosta & R. Fernández) T.F. Daniel.

This revision reflects and presents some significant taxonomic and distributional alterations. In addition to the generic renovations noted above, a new species of *Justicia* (*J. velizii*) is described from Izabal and Petén; *J. macrantha* var. *piliformis* is elevated to specific rank as *J. williamsii*; and two new combinations in *Stenostephanus* are proposed. New distributional records include: species reported for political departments for the first time, additions of native species to the country (either via collections or taxonomic renovations), and additions of three exotic species that have become naturalized in Guatemala.

TABLE 1. Summary of Guatemalan Acanthaceae

Genus	**Number of Native Species**	**Number of Endemic Species**	**Number of Naturalized Species**
Aphelandra	6	0	0
Asystasia	0	0	1
Avicennia	1	0	0
Barleria	1	0	0
Bravaisia	3	0	0
Carlowrightia	1	0	0
Chileranthemum	1	0	0
Dicliptera	9	2	0
Dyschoriste	3	0	0
Elytraria	2	0	0
Henrya	1	0	0
Hygrophila	1	0	0
Hypoestes	0	0	1
Justicia	39	9	0
Lepidagathis	2	0	0
Louteridium	2	0	0
Mendoncia	3	0	0
Odontonema	7	1	0
Poikilacanthus	3	2	0
Pseuderanthemum	4	0	0
Razisea	1	0	0
Ruellia	21	0	1
Sanchezia	0	0	1
Schaueria	1	0	0
Spathacanthus	2	0	0
Stenandrium	3	0	0
Stenostephanus	4	2	0
Tetramerium	3	0	0
Thunbergia	0	0	3
Totals	**124**	**16**	**7**

Guatemalan Acanthaceae represent most major lineages of the family. Appendix I shows the major phylogenetic clades of Acanthaceae and lists currently recognized genera of Guatemalan Acanthaceae in each. It is clear that Acanthoideae are most prevalent, and that within this subfamily, genera of Justicieae are best represented. *Justicia* includes some 700 species worldwide, and with 39 of them native in Guatemala, it is the largest genus of Acanthaceae in the country. Nine of these species (23%) are endemic to Guatemala. *Ruellia* (Ruellieae), the second largest genus of Guatemalan Acanthaceae, is represented by 21 native species, none of them endemic to the country.

Life forms of Guatemalan Acanthaceae vary from annual (e.g., *Dicliptera unguiculata*) to perennial (*Justicia ramulosa*) herbs to shrubs (e.g., *Odontonema steyermarkii*) to lianas (e.g., *Men-*

doncia guatemalensis) to trees (e.g., *Bravaisia integerrima*). Flowers of Guatemalan Acanthaceae are particularly variable (Figs. 2–4), undoubtedly reflecting the diversity of floral visitors and pollinators that are attracted to them. Floral rewards of Guatemalan Acanthaceae consist of sugary floral nectar and protein-rich pollen. Morphological diversity of pollen among Guatemalan Acanthaceae (Figs. 5–9) is also substantial, reflecting the phylogenetic and taxonomic array of species occurring in the region (Appendix I), and is comparable to that documented for Mexico (Daniel 1998). Animal visitors (including pollinators) to flowers of Acanthaceae that occur in Guatemala (based on literature reports, herbarium specimen notes, and personal observations) include: hummingbirds (e.g., *Justicia aurea*), flies (e.g., *Tetramerium nervosum*), bees (e.g., *Bravaisia integerrima*), butterflies (*Ruellia nudiflora*), ants (e.g., *Aphelandra scabra*), and bats (e.g., *Louteridium* spp.). Additional floral visitors undoubtedly are attracted to the diverse array of acanthaceous flowers in Guatemala, but they remain unstudied or undocumented. In general, flowers of these and other Acanthaceae are generalists that attract, and can be effectively pollinated by, more than one type of floral visitor.

In addition to the native Acanthaceae occurring in Guatemala, at least 32 species of the family are known to be cultivated in the country. Herbarium specimens document the following species of Acanthaceae as cultivated for ornament in Guatemala: *Acanthus mollis* L., *Aphelandra schiedeana* Schltdl. & Cham., *Asystasia gangetica* (L.) T. Anders., *Crossandra infundibuliformis* (L.) Nees, *Eranthemum pullchellum* Andrews, *Graptophyllum pictum* (L.) Griff., *Hypoestes phyllostachya* Baker, *Justicia aurea* Schltdl., *J. betonica* L., *J. brandegeana* Wassh. & L.B. Sm., *J. carnea* Lindl., *Louteridium donnell-smithii* S. Watson, *Megaskepasma erythrochlamys* Lindau, *Odontonema cuspidatum* (Nees) Kuntze, *O. tubaeforme* (Bertol.) Kuntze, *Pachystachys lutea* Nees, *P. spicata* (Ruiz & Pav.) Wassh., *Pseuderanthemum carruthersii* (Seem.) Guillaumin, *Ruellia brevifolia* (Pohl) Ezcurra, *R. coerulea* Morong, *R. jussieuoides* Schlecht., *R. malacosperma* Greenm., *R. tuberosa* L., *Sanchezia parvibracteata* Sprague & Hutch., *Strobilanthes dyerianus* Mast., *Thunbergia alata* Bojer ex Sims, *T. erecta* (Benth.) T. Anders., *T. fragrans* Roxb., *T. gregorii* S. Moore, *T. grandiflora* Roxb., *T. laurifolia* Lindl., and *T. mysorensis* (Wight) Bedd. Seven of these have escaped cultivation and become naturalized in Guatemala: *Asystasia gangetica*, *Hypoestes phyllostachya*, *Ruellia tuberosa*, *Sanchezia parvibracteata*, *Thunbergia alata*, *T. fragrans*, and *T. grandiflora*. Other cultivated Acanthaceae likely occur or will be found as naturalized or escaped exotics (e.g., *Justicia betonica*, *Ruellia brevifolia*). Indeed, a collection of *Ruellia brevifolia* (=*R. graezicans* Backer) from Santa Rosa (*Flores s.n.*, 5 Nov 1994 at UVAL) was not noted to have been cultivated and might represent a naturalized occurrence. Five or six native Guatemalan Acanthaceae are among the known cultivated ornamentals: *Aphelandra schiedeana*, *Justicia aurea*, *Louteridium donnell-smithii*, *Odontonema cuspidatum* (see below regarding its status as native), *O. tubaeforme* (Bertol.) Kuntze, and *Ruellia jussieuoides*. Other natives are undoubtedly cultivated locally as well (e.g., *Justicia colorifera*, *J. spicigera*). As a result of their growth form and/or floral showiness, additional Guatemalan natives are cultivated outside the country (e.g., *Aphelandra aurantiaca*, *Barleria oenotheroides*, *Odontonema callistachyum*, *Pseuderanthemum alatum*), and others appear worthy of cultivation as ornamentals: *Aphelandra speciosa*, *Bravaisia berlandieriana*, *B. grandiflora*, *Justicia fimbriata*, *J. williamsii*, *Mendoncia lindavii*, *Odontonema steyermarkii*, *Poikilacanthus macranthus*, and *Ruellia maya*.

As might be expected due to extended collecting activities in Guatemala leading to the *Flora of Guatemala*, the largest and most comprehensive collection of Acanthaceae from that nation resides at F. Other collections with significant holdings of Acanthaceae from Guatemala are BIGU, MO, and US. As of 2010, about 40 species of Acanthaceae that are known from Guatemala are not represented by Guatemalan collections in the four major herbaria in Guatemala. However, the

Guatemalan herbaria generally house more recent collections of Acanthaceae than those elsewhere, and many of them are not duplicated elsewhere. The taxonomic infrastructure developed at Guatemalan herbaria has resulted in many important discoveries, and has greatly enhanced knowledge of the flora of northern Central America.

Ecological Diversity. In Guatemala, species of Acanthaceae occur at elevations from sea level (e.g., *Avicennia germinans*, *Ruellia blechum*) to 2800 meters (e.g., *Dyschoriste capitata*, *Odontonema tubaeforme*). Although Acanthaceae occur in most of Guatemala's biotic communities, they are absent from alpine communities (*cf.* Islebe and Cleff 1995). They are especially prevalent in lowland and montane tropical moist to wet forests, cloud forests, evergreen seasonal forests, and tropical dry forests. The most common habitat of Guatemalan Acanthaceae is along watercourses (wet or seasonally dry). Most collections of Guatemalan Acanthaceae do not provide data on vegetation type/biotic community, but based on the information available from collections, personal observations, and known ecological data about Guatemalan species that occur elsewhere in Mesoamerica, it is possible to assign 49 species as restricted to either relatively wet (e.g., mesophytic montane forest, rain forest, cloud forest) or dry (tropical subdeciduous forest, tropical deciduous forest, thornscrub) biotic communities. Of these, forty (82%) are restricted to relatively wet communities and nine (18%) are restricted to dry communities. Others occur in both wet and dry communities or the communities in which they occur in Guatemala are not known. Although many species occur in diverse biotic communities, others appear to be confined to distinctive communities such as manglar (e.g., *Avicennia germinans*), cloud forest (e.g., *Spathacanthus hahnianus*), tropical deciduous forest (e.g., *Justicia ramosa*), lowland rain forest (e.g., *Justicia viridescens*), and aquatic to subaquatic communities (e.g., *Hygrophila costata*). Of the 16 species of Acanthaceae endemic to Guatemala, eight of them are known only from relatively wet biotic communities; none of the endemics is known to occur in the dry communities. This contrasts with dry regions in Chiapas and the Yucatan Peninsula of Mexico, where numerous Acanthaceae are endemic. Although no Acanthaceae are known to be endemic to Guatemala's dry communities, the existence of thornscrub and tropical deciduous forests in Guatemala (e.g., Véliz 2002) has lead to the enrichment of the nation's acanthaceous flora because several widespread species (e.g., *Carlowrightia arizonica*, *Justicia caudata*, *J. ramosa*) occur only in these communities.

Distribution in Guatemala. A geographic summary of species richness among Guatemalan Acanthaceae by department is shown in Figure 1. Departments with the greatest concentrations of species of Acanthaceae are Alta Verapaz (51), Petén (46), Izabal (42), and Huehuetenango (38). Likely reasons for the high numbers of species in these political regions include: size (these four departments are among the five largest in area), collecting activities (at least Huehuetenango, Izabal, and Alta Verapaz are among the better collected departments; MacVean and Davidse 2007), and numbers and types of biotic communities present (e.g., Huehuetenango has a high number of biotic communities and Izabal has the nation's only large region of lowland rain forest, a community in which Acanthaceae are particularly prevalent; see figure 7 in Castañeda 2008 and MAGA 2001). Departments with the least number of acanthaceous species are Totonicapán (1) and Jalapa (7). Reasons for the lack of Acanthaceae in these departments are similar: size (both departments are among the eight smallest in Guatemala), collecting activities (both departments are among the least collected ones; MacVean and Davidse 2007), and numbers/types of communities present (e.g., both departments have relatively few communities, the major one in each being dominated by pine-oak forest, which is generally depauperate in Acanthaceae; see MAGA 2001, Daniel 2005, and figure 7 in Castañeda 2008). Also, Totonicapán is one of the highest (and coldest) departments in the country, and Acanthaceae are generally absent from high/cold regions of the tropics. Surprisingly and somewhat inexplicably, Quiché, the fourth largest department in Guatemala, contains a rela-

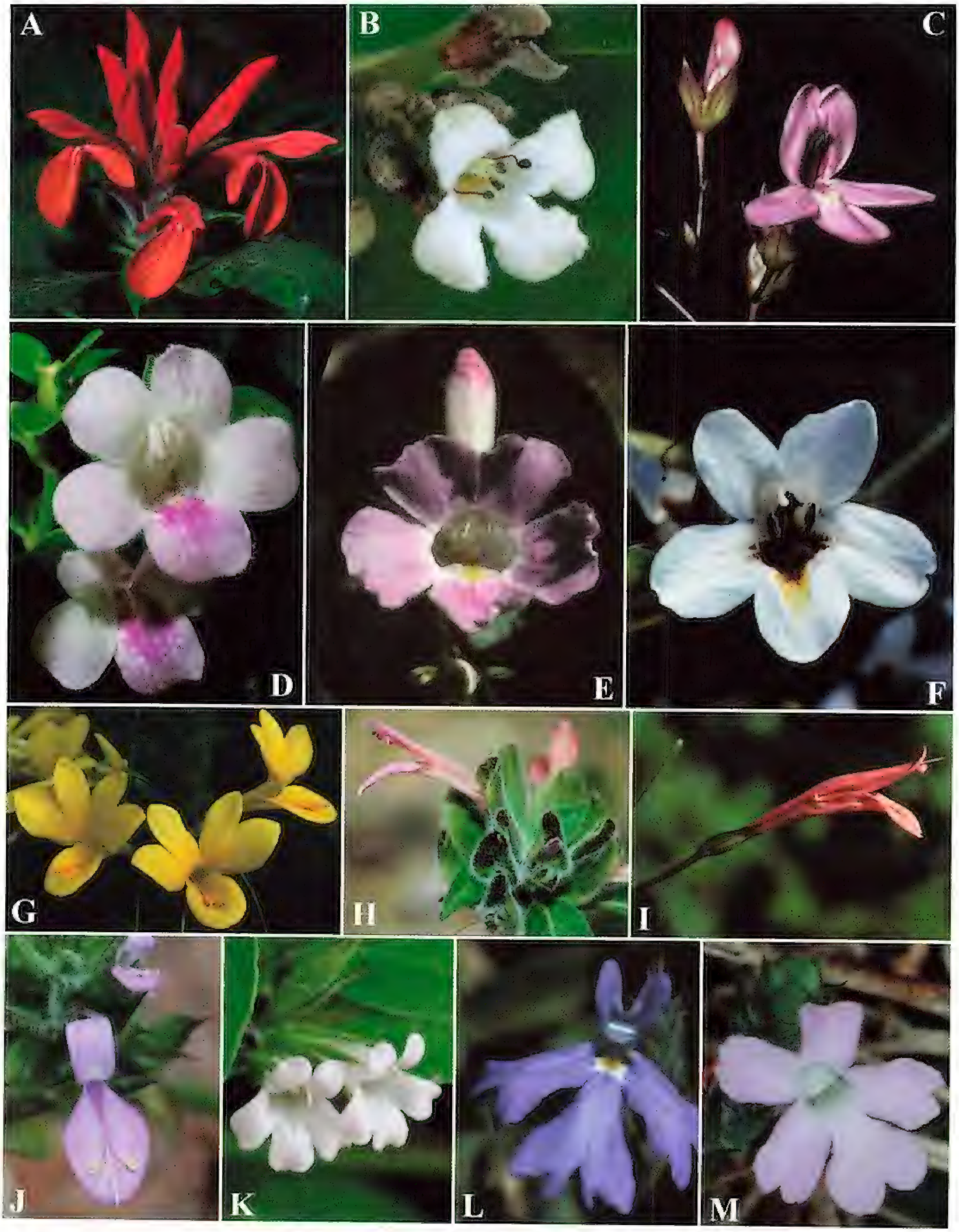


FIGURE 2. Guatemalan Acanthaceae I. A. *Aphelandra gigantiflora*. B. *Avicennia germinans*. C. *Chileranthemum pyramidatum*. D. *Bravaisia berlandieriana*. E. *B. grandiflora*. F. *B. integerrima*. G. *Barleria oenotheroides*. H. *Dicliptera guttata*. I. *D. sciadephora*. J. *D. unguiculata*. K. *Dyschoriste quadrangularis*. L. *Elytraria imbricata*. M. *E. bromoides*. Photos by T. Daniel except B (W. Eckerman), C (D. Breedlove), and D (G. Carnevali).

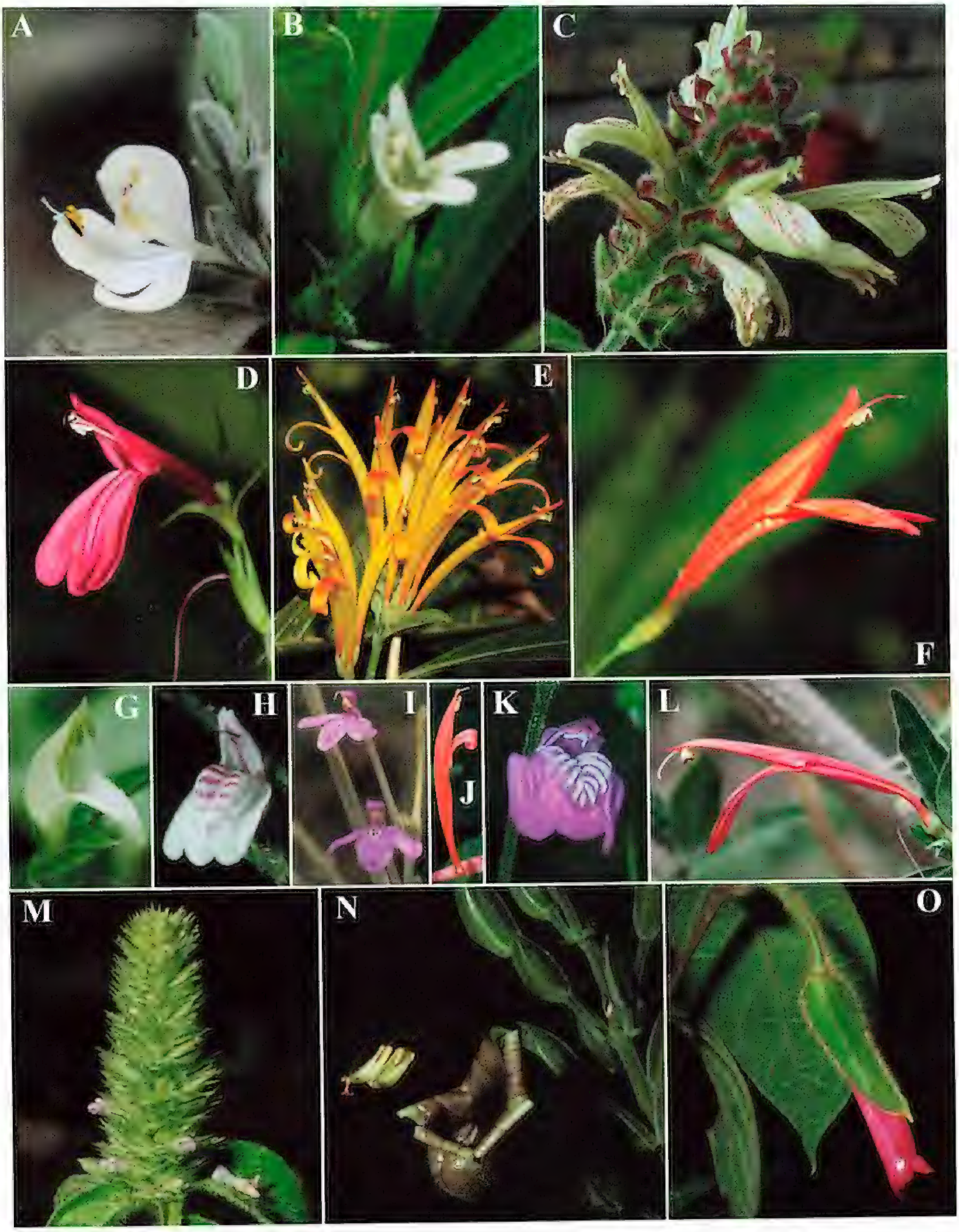


FIGURE 3. Guatemalan Acanthaceae II. A. *Henrya insularis*. B. *Hygrophila costata*. C. *Justicia ciriloi*. D. *J. inaequalis*. E. *J. fimbriata*. F. *J. velizii*. G. *J. viridescens*. H. *J. comata*. I. *J. ramosa*. J. *J. spicigera*. K. *J. pectoralis*. L. *J. williamsii*. M. *Lepidagathis alopecuroides*. N. *Louteridium donnell-smithii*. O. *Mendoncia lindavii*. Photos by T. Daniel except N (D. Breedlove).

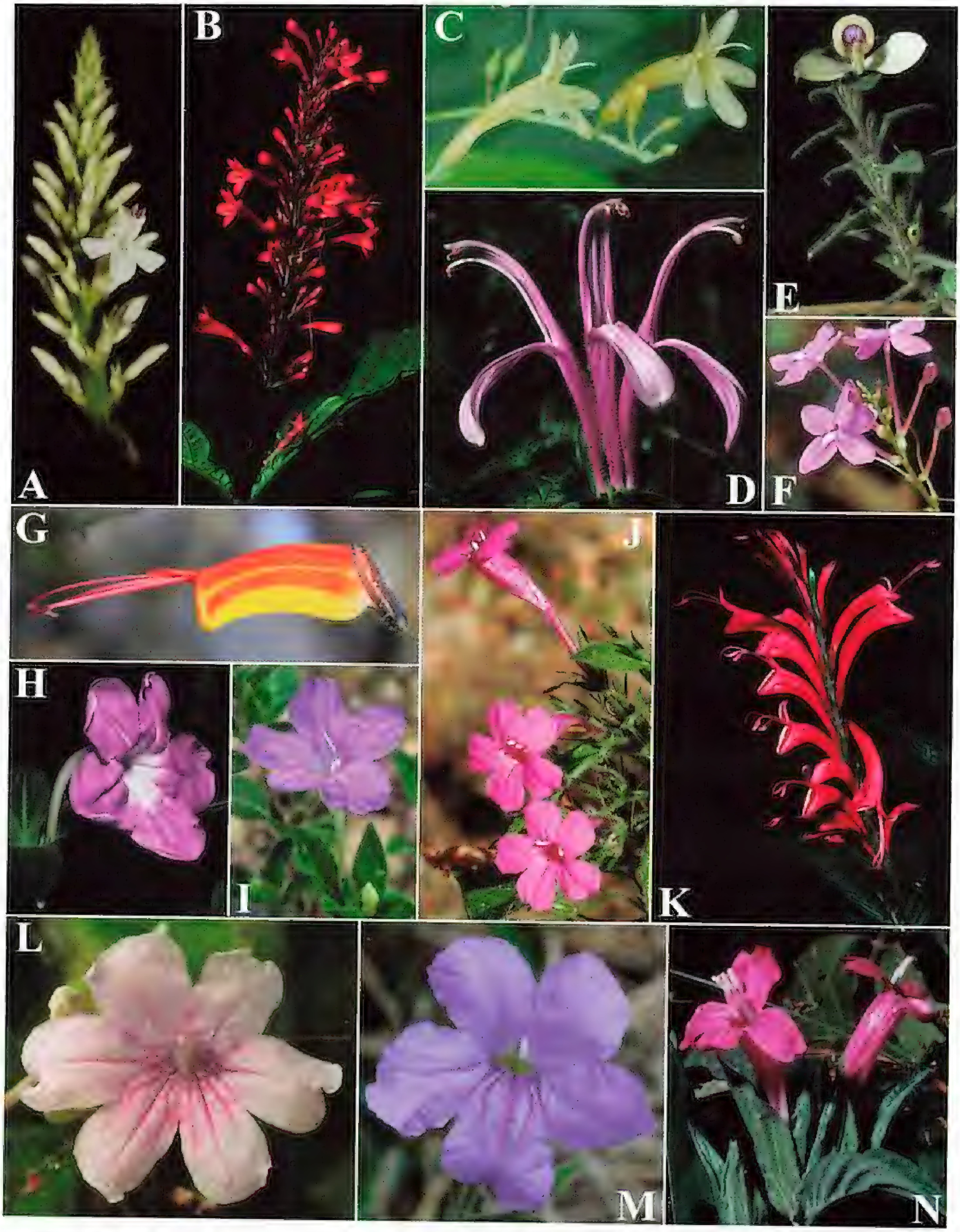


FIGURE 4. Guatemalan Acanthaceae III. A. *Odontonema hondurense*. B. *O. tubaeforme*. C. *O. hondurense*. D. *Poikilacanthus macranthus*. E. *Tetramerium nemorum*. F. *Pseuderanthemum alatum*. G. *Stenostephanus monolophus*. H. *Ruellia maya*. I. *R. hookeriana*. J. *R. inundata*. K. *Razisea spicata*. L. *Ruellia metallica*. M. *R. nudiflora*. N. *R. megasphaera*. Photos by T. Daniel.

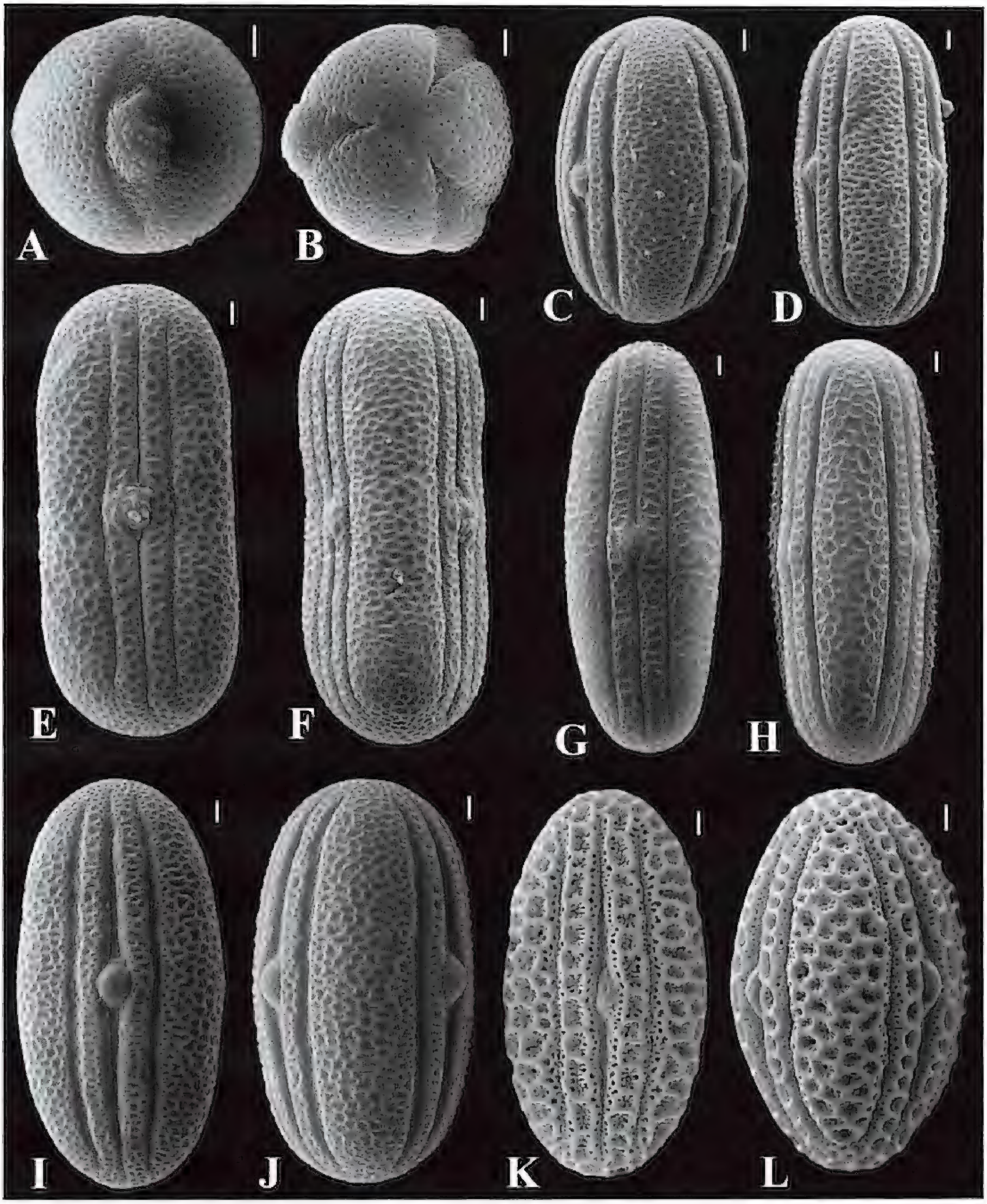


FIGURE 5. Pollen of Guatemalan Acanthaceae I. A. *Avicennia germinans* (*Daniel & Araque 9478*), apertural view of 3-colporate grain. B. *A. germinans* (*Daniel & Araque 9478*), polar view of 3-colporate grain. C. *Dicliptera debilis* (*Standley 91106*), interapertural view. D. *D. inutilis* (*Johnston 1739*), interapertural view. E. *D. sexangularis* (*Daniel et al. 11232*), apertural view. F. *D. sexangularis* (*Daniel et al. 11232*), interapertural view. G. *D. guttata* (*Daniel et al. 11226*), apertural view. H. *D. guttata* (*Daniel et al. 11226*), interapertural view. I. *D. sciadephora* (*Daniel & Véliz 11208*), apertural view. J. *D. sciadephora* (*Daniel & Véliz 11208*), interapertural view. K. *D. unguiculata* (*Daniel & Barreno 11264*), apertural view. L. *D. unguiculata* (*Daniel & Barreno 11264*), interapertural view. Scales = 3 μm.

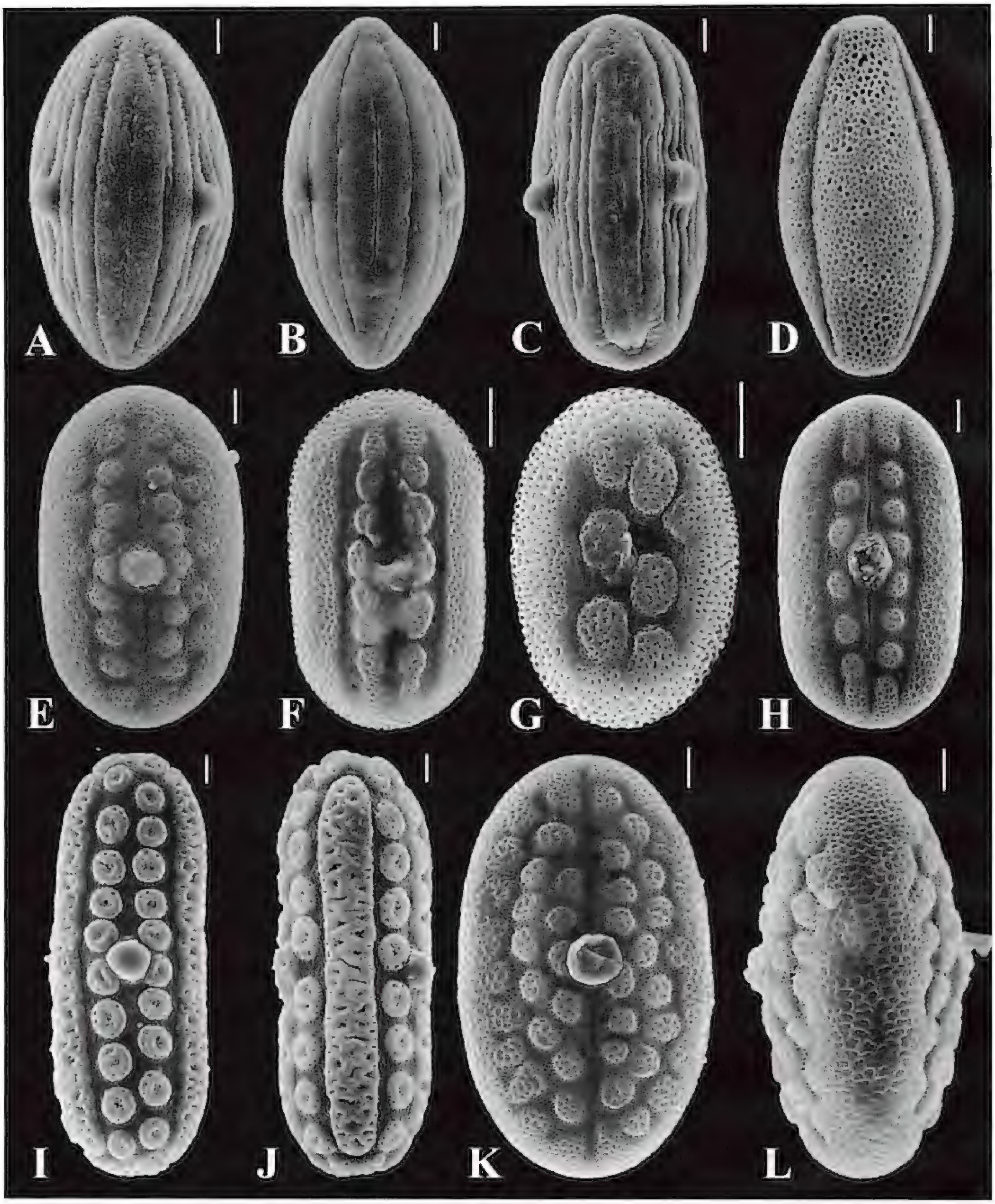


FIGURE 6. Pollen of Guatemalan Acanthaceae II. A. *Dyschoriste capitata* (*Breedlove 26151*), interapertural view. B. *D. ovata* (*Breedlove & Strother 46563*), interapertural view. C. *D. quadrangularis* (*Breedlove & Anderson 63705*), interapertural view. D. *Elytraria bromoides* (*Daniel & Baker 3683*), interapertural view. E. *Justicia bartlettii* (*Breedlove & Almeda 57832*), apertural view. F. *J. candelariae* (*Skutch 2009*), apertural view. G. *J. comata* (*Breedlove 38648*), apertural view. H. *J. kanal* (*Breedlove & Bourell 68262*), apertural view. I. *J. fimbriata* (*Daniel & Bartholomew 4992*), apertural view. K. *J. fimbriata* (*Daniel & Bartholomew 4992*), interapertural view. L. *J. inaequalis* (*Matuda 3990*), apertural view. M. *J. inaequalis* (*Matuda 3990*), interapertural view. Scales = 5 µm.

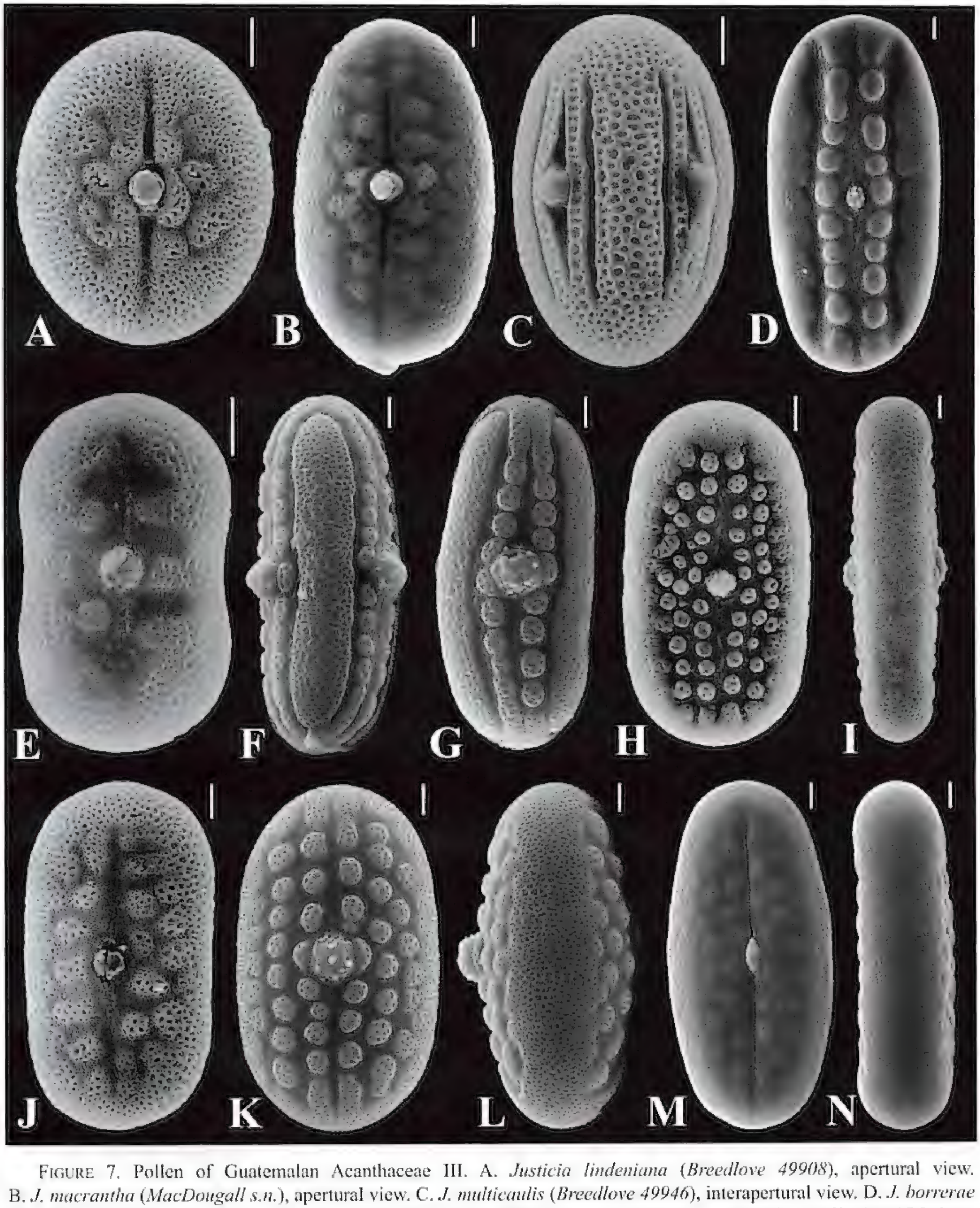


FIGURE 7. Pollen of Guatemalan Acanthaceae III. A. *Justicia lindeniana* (*Breedlove 49908*), apertural view. B. *J. macrantha* (*MacDougall s.n.*), apertural view. C. *J. multicaulis* (*Breedlove 49946*), interapertural view. D. *J. borrerae* (*Breedlove 35290*), apertural view. E. *J. pectoralis* (*Breedlove 48559*), apertural view. F. *J. pedicellata* (*Véliz 95.4376*), interapertural view. G. *J. pedicellata* (*Véliz 95.4376*), apertural view. H. *J. spicigera* (*Breedlove 9431*), apertural view. I. *J. spicigera* (*Avila B. 28*), interapertural view. J. *J. pringlei* (*Breedlove & Strother 46783*), apertural view. K. *J. velizii* (*Contreras 6183*), apertural view. L. *J. velizii* (*Contreras 6183*), interapertural view. M. *J. williamsii* (*Daniel & Barreno 11265*), apertural view. N. *J. williamsii* (*Daniel & Barreno 11265*), interapertural view. Scales = 5 µm.

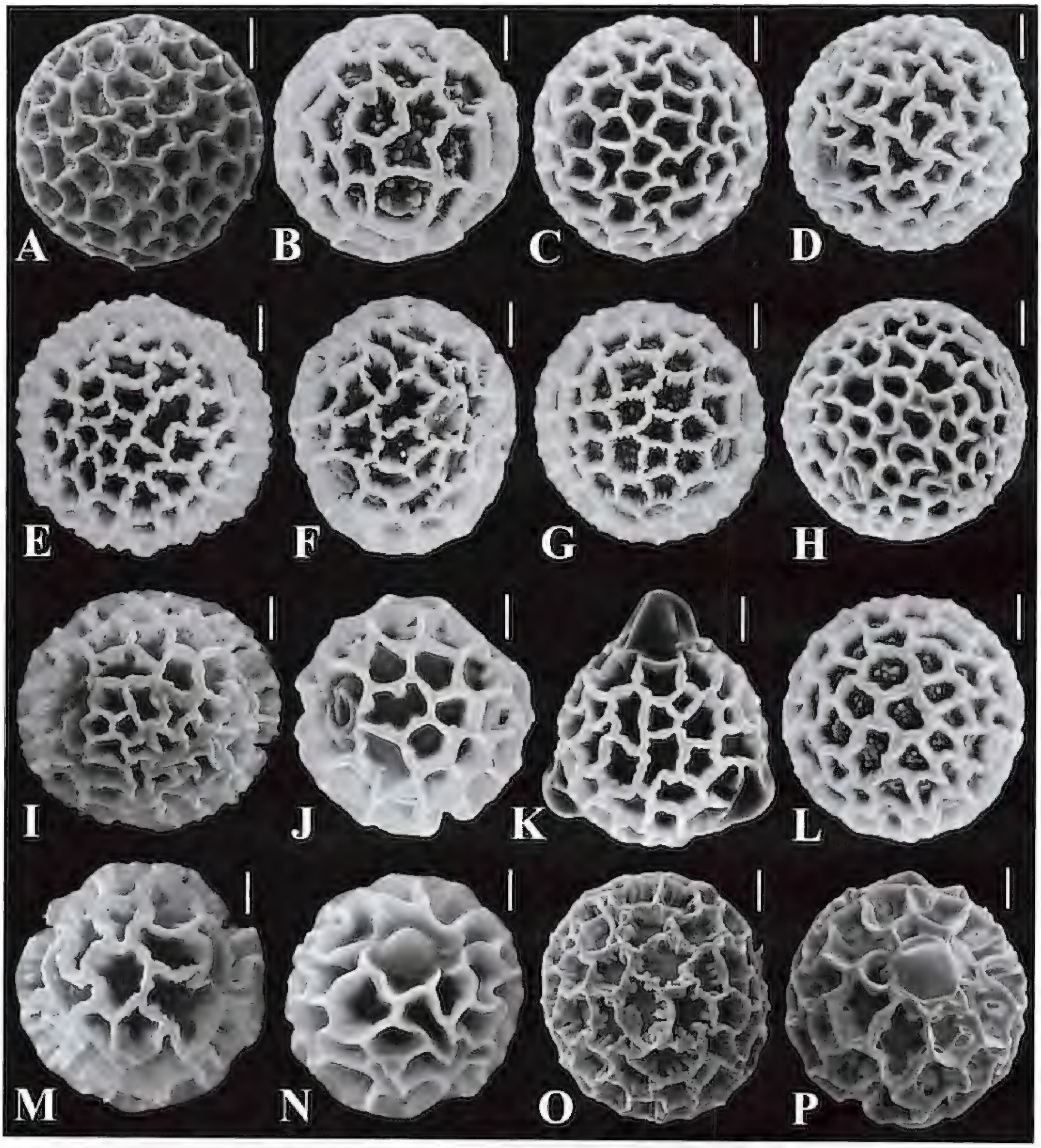
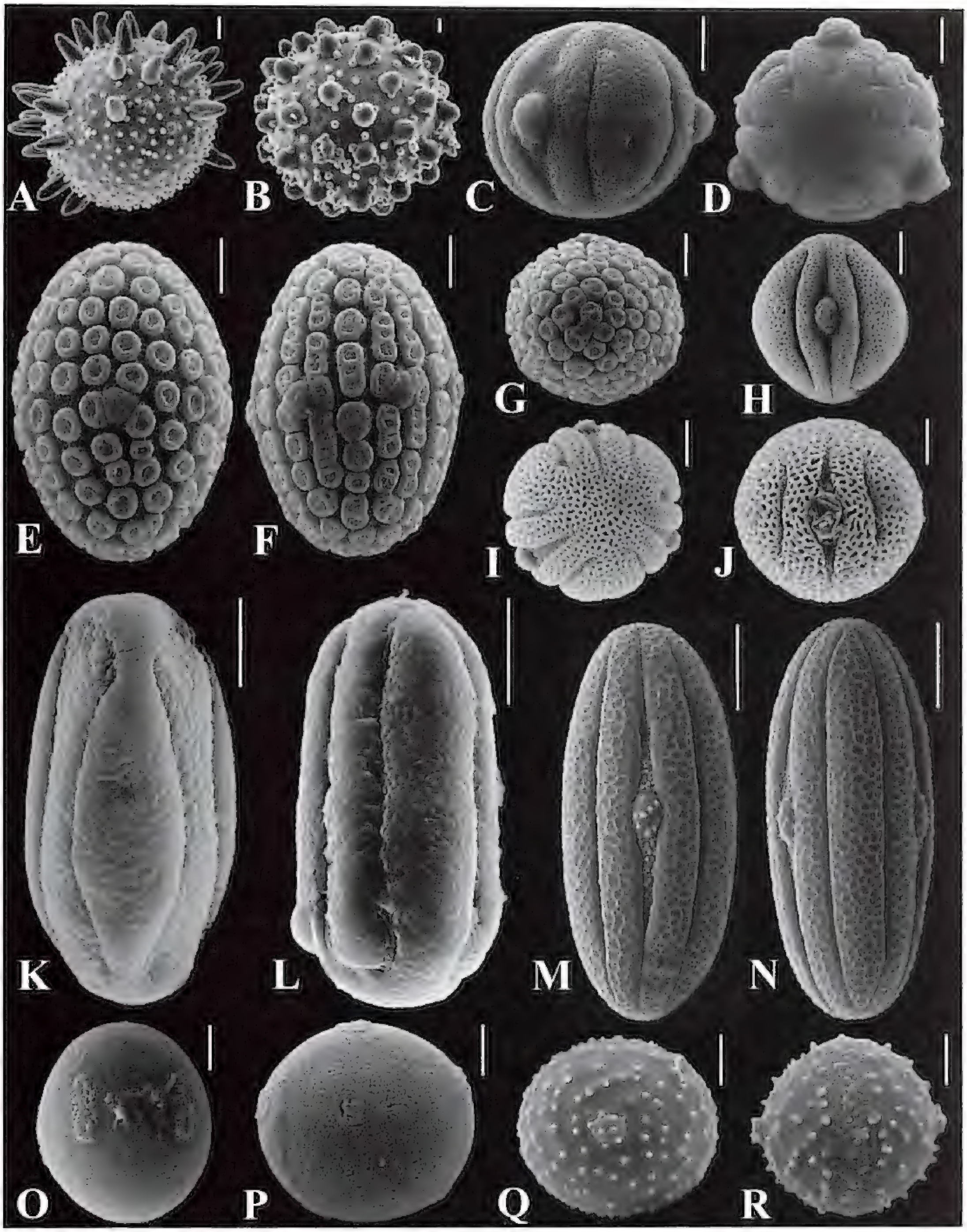


FIGURE 8 (above). Pollen of Guatemalan Acanthaceae IV. A. *Ruellia donnell-smithii* (*Rosales 206*). B. *R. geminiflora* (*Breedlove 9163*). C. *R. harveyana* (*Hernández G. 447*). D. *R. hookeriana* (*Breedlove & Daniel 71060*). E. *R. jussieuoides* (*Breedlove & Almeda 57192*). F. *R. lactea* (*Tenorio L. & Romero de T. 6720*). G. *R. matagalpae* (*Breedlove & Daniel 70899*). H. *R. maya* (*Daniel & Bartholomew 5000*). I. *R. metallica* (*Hammel 8006*). J. *R. paniculata* (*Breedlove & McClintock 23447*). K. *R. pereducta* (*Davidse et al. 20405*), polar view. L. *R. puberula* (*Salinas T. et al. 6898*). M. *R. pygmaea* (*Lundell 18320*). N. *R. pygmaea* (*Lundell 18320*), apertural view. O. *R. spissa* (*Galván & Galván 3297*). P. *R. stemonacanthoides* (*Durkee 83-3*), apertural view. Scales = 10 μm.

FIGURE 9 (right). Pollen of Guatemalan Acanthaceae V. A. *Louteridium donnell-smithii* (*Breedlove 57578*). B. *L. purpusii* (*Breedlove 31613*). C. *Odontonema steyermarkii* (*Standley 88361*), equatorial view. D. *O. steyermarkii* (*Standley 88361*), polar view. E. *Poikilacanthus skutchii* (*Breedlove & Almeda 64860*), apertural view. F. *P. skutchii* (*Breedlove & Almeda 64860*), interapertural view. G. *P. skutchii* (*Breedlove & Almleda 64860*), polar view. H. *Pseuderanthemum verapazense* (*Wendt et al. 3113*), apertural view. I. *P. alatum* (*Daniel & Baker 3713*), polar view. J. *P. cuspidatum* (*Breedlove &



Daniel 70880), apertural view. K. *Stenandrium pedunculatum* (*Bullock 1366*), interapertural view. L. *S. subcordatum* (*Chater et al. 3*), subapertural view. M. *Tetramerium nemorum* (*Daniel et al. 11214*), apertural view. N. *T. nemorum* (*Daniel et al. 11214*), interapertural view. O. *Mendoncia lindavii* (*Evans 1630*), equatorial view. P. *M. lindavii* (*Evans 1630*), polar view. Q. *Stenostephanus azureus* (*Williams et al. 25595*), apertural view. R. *S. azureus* (*Williams et al. 25595*), interapertural view. Scales = 10 μm.

tively low number of Acanthaceae. Additionally, there does not appear to be a consistent positive correlation between relative numbers of different geologic substrates in departments (based on Bonis et al. 1975) and species richness of Acanthaceae. For example, whereas Izabal and Huehuetenango have high numbers of species and geologic substrates, Alta Verapaz has high numbers of species but very few types of geologic substrates and Quiché has a relatively low number of species but many geologic substrates. These and other factors that influence species richness and diversity in Guatemala were discussed by Castañeda (2008).

Twenty-nine species of Acanthaceae are known from only a single department in Guatemala. These include local Guatemalan endemics (e.g., *Dicliptera debilis*, *D. guttata*, *Justicia gibsoniae*, *J. neomontana*, *J. steyermarkii*, *J. viridescens*, *Poikilacanthus pansamalanus*), species endemic to Guatemala and adjacent regions in one or more surrounding nations (e.g., *Bravaisia berlandieriana*, *Dicliptera antidysenterica*, *Justicia albobractea*, *J. ciriloi*, *J. tianguensis*, *Ruellia maya*, *Spathacanthus hahnianus*), widely distributed species that are rare in Guatemala (e.g., *Justicia ramulosa*, *Pseuderanthemum alatum*), and species that attain the northwestern (e.g., *Razisea spicata*) or southeastern (e.g., *Dicliptera thlaspioides*) extent of their distributions by a single known occurrence in the country near its western or eastern borders.

Species of Acanthaceae that have the broadest distribution in Guatemala (based on occurrences by department) are *Aphelandra scabra* (19), *Elytraria imbricata* (17), *Justicia aurea* (16), *Ruellia blechum* (14), and *Odontonema tubaeforme* (13). *Aphelandra scabra*, a shrub, is likely so widely distributed in Guatemala because of its ecological amplitude, which enables it to occur at low to high elevations (0—1850 m) in both relatively wet and relatively dry habitats. The broadly distributed (North America, Central America, West Indies, and South America) perennial herbs *Elytraria imbricata* and *Ruellia blechum* are particularly weedy (especially in disturbed habitats) and occur over considerable ranges of elevation. The shrubs *Odontonema tubaeforme* and *Justicia aurea* have more restricted distributions (North America and Central America), are generally restricted to moist to wet forests, but have substantial elevational ranges (e.g., 50–2800 m for *O. tubaeforme*). Thus, although this group of five species shows diversity in habit and habitat, their tendency toward weediness and/or their considerable ecological/elevational amplitude likely help to explain their broad geographic occurrences in Guatemala.

Conservation. The conservation status has not been determined for any Guatemalan Acanthaceae based on the IUCN red list criteria (IUCN 2009). However, 29 Guatemalan Acanthaceae were included in the *1997 IUCN Red List of Threatened Plants* (Walter and Gillett 1998), and 17 species were listed as threatened in Guatemala by the Consejo Nacional de Áreas Protegidas (CONAP 2006). Guatemalan Acanthaceae listed by the IUCN (Walter and Gillett 1998), with their status in Guatemala, consist of: *Aphelandra speciosa* (rare), *Bravaisia grandiflora* (rare), *Dicliptera antidysenterica* (not listed from Guatemala; rare in Honduras), *D. debilis* (indeterminate), *D. guttata* (indeterminate), *D. inutilis* (indeterminate), *D. membranacea* (vulnerable), *Stenostephanus azureus* (as *Habracanthus azureus*; rare), *S. latilabris* (as *Habracanthus latilabris*; rare), *S. ruberrimus* (as *Habracanthus ruberrimus*; rare), *Henrya insularis* (as *H. gualanensis*; indeterminate), *Justicia bartlettii* (indeterminate), *J. borrerae* (rare), *J. gibsoniae* (as *J. grandiflora*; rare), *J. neomontana* (as *J. montana*; rare), *J. multicaulis* (vulnerable), *J. pedicellata* (rare), *J. ramosa* (as *Siphonoglossa ramosa* var. *discolor* and as *S. ramosa* var. *hondurensis*; indeterminate), *J. silvicola* (rare), *J. steyermarkii* (indeterminate), *J. sulfurea* (vulnerable), *J. viridescens* (as *Megalostoma viridescens*; vulnerable), *Lepidagathis guatemalensis* (as *Lophostachys guatemalensis*; rare), *Louteridium purpusii* (as *L. mexicanum*; rare), *Poikilacanthus macranthus* (as *P. setiferus*; rare), *P. pansamalanus* (vulnerable), *P. skutchii* (rare), *Schaueria parviflora* (as *Streblacanthus parviflorus*, vulnerable), and *Stenandrium subcordatum* (rare). All 17 species of Acanthaceae listed by CONAP (2006) were noted to be taxa that are not in danger of extinction at present but which could become so if not regulated. They consist of *Chileranthemum pyramidatum*, *Dicliptera debilis*, *D. guttata*, *D. inutilis*, *Henrya insularis* (as *H. gualanensis*), *Justicia gibsoniae* (as *J. grandifolia*), *J. neomontana* (as *J. montana*), *J. silvicola*, *J. steyermarkii*, *J. sulfurea*, *J. viridescens* (as *Megalostoma viridescens*), *Poikilacanthus pansamalanus*, *P. skutchii*, *Schaueria parviflora* (as *Streblacanthus parviflorus*), *Stenostephanus azureus* (as *Habracanthus azureus*), *S. latilabris* (as *Habracanthus latilabris*), and *S. ruberrimus* (as *Habracanthus ruberrimus*).

In this study, the numbers of known collections (mostly from different localities) and date of collections ("recent" refers to collections made since 1985) were taken into account to provide some assessment of relative rarity among Guatemalan Acanthaceae. Although numerous species either have been treated as "threatened" in some way by others (e.g., Walter and Gillett 1998; CONAP 2006) or are here considered to be rare (i.e., known by multiple collections from only a single locality or by no more than three collections from different localities) to possibly extirpated in Guatemala, they occur, sometimes abundantly, in other countries. These species (along with notes relevant to their conservation status) are:

Aphelandra speciosa (known by more than 10 collections, some of them recent, from Chiapas, Mexico and three departments in Guatemala, suggesting that the species is not at risk at present; Daniel 1991a),

Bravaisia grandiflora (known by more than 20 collections, some of them recent, from Mexico, Belize, and four departments in Guatemala, suggesting that the species is not at risk; Daniel 1988),

Chileranthemum pyramidatum (although known from relatively few collections in two departments of Guatemala, the species has been collected several times recently in Huehuetenango; it also occurs in El Salvador and at least three states in Mexico, where it is known from sufficient populations to suggest that the species is not currently at risk; Daniel 1995a, 1995b, 2001),

Dicliptera antidysenterica (known from one or more historical collections from Guatemala and at least six collections, including recent ones, from Honduras; the overall status of the species remains unknown; Daniel 2005),

Dicliptera inutilis (known only by two collections, made between 1930 and 1941, from two departments in Guatemala, and by a possible occurrence in Belize, based on a recent collection; the overall status of the species is unknown; Daniel 1997a),

Dicliptera membranacea (known from numerous collections, including recent ones, from various states of Mexico and at least two [possibly three, see below] departments in Guatemala, suggesting that the species is not at risk at present; Daniel 2009),

Dicliptera thlaspioides (widely distributed and collected in Mexico, and known from a single locale in Guatemala; recent collections have been made in both nations, and the species would not appear to be at risk; Daniel 2009),

Henrya insularis (occurs throughout much of Mexico and Central America, sometimes abundantly, and is not at risk; Daniel 1990a),

Justicia bartlettii (known from sufficient collections, including recent ones, in Mexico, Belize, and Guatemala to suggest that the species is not at risk; Daniel 1995b),

Justicia borrerae (known from sufficient collections, including recent ones, in Mexico and two departments in Guatemala so that the species would not appear to be at risk; Daniel 1995b),

Justicia ciriloi (known by three collections from two departments in Honduras, made in the early 1980s, and the type, collected in 1939 in Guatemala; the species is likely either rare or possibly extirpated in Guatemala; its overall status remains unknown; Daniel 2005),

Justicia clinopodium (although rare in Guatemala, the species is known from sufficient collections, including recent ones, from several states in Mexico to suggest that the species is not at risk; Daniel 1995b),

Justicia lindeniana (although rare in Guatemala the species is known from 10 or more collections in several states of southern Mexico; its overall status remains unknown; Daniel 1995b),

Justicia multicaulis (known by at least five collections from Chiapas and by collections, including at least one recent one, from three departments in Guatemala; its overall status remains unknown; Daniel 1995b), *Justicia pringlei* (although rare in Guatemala the species is known from sufficient collections, including recent ones, from numerous states in Mexico that the species is not at risk; Daniel 1995b),

Justicia ramosa (known from three departments in Guatemala, Mexico, Central America, and northern south America, including recent collections in most regions; the species is often abundant where it occurs, and is not at risk; Daniel 1995b, 2005),

Justicia ramulosa (although rare in Guatemala, the species is known from several nations of Central America and South America; recent collections have been made in several of these and the species is not at risk; Daniel 2005),

Justicia sulfurea (known from two departments in Guatemala and by at least two occurrences in El Salvador, this species was last collected in 1972, and its overall status remains unknown; Daniel 2004a),

Justicia tianguensis (known only by the the type from Chiapas and a single collection from Guatemala made in 1969; the species is likely rare or endangered; Daniel 1995a, 1995b),

Justicia valvata (known from a single locale in Guatemala, and collected at least three times in Veracruz, Mexico; the species was last collected in 1982, and it appears to be rare; Daniel 2003),

Lepidagathis guatemalensis (known from three departments in Guatemala, the species also occurs and has been collected recently in both southern Mexico and El Salvador; it is likely not currently at risk; Daniel 1993a, 2008),

Louteridium purpusii (known from several collections from two departments in Guatemala and by at least five collections from Chiapas, Mexico; the overall status of the species remains unknown; Daniel 1995b),

Mendoncia guatemalensis (known from a single department in Guatemala where rarely collected; the species is known by recent collections from Mexico and Honduras; the overall status of this species is unknown; Daniel 1992, 2005),

Poikilacanthus macranthus (known by numerous collections, including recent ones, from eight departments in Guatemala and from southern Mexico to Panama; this species is not at risk; Daniel 1991b, 1995b),

Pseuderanthemum alatum (although known only from a single department in Guatemala where it is uncommonly, but recently, collected, this species is known by numerous, and often recent, collections from Mexico to Nicaragua; it is not currently at risk; Daniel 1995b),

Razisea spicata (although known only by a single collection made in 1941 from Guatemala, this species is known from numerous, often recent collections, from Nicaragua to Colombia; it is not currently at risk; Durkee 1978, 1986),

Ruellia maya (known by at least five historical collections and a recent collection from a single department in Guatemala, this species is known by at least 15 collections, including recent ones, from Chiapas, Mexico; it does not appear to be at risk at present; Daniel 1995a, 1995b),

Schaueria parviflora (known by few collections from a limited region of Guatemala, the species also occurs in Oaxaca and Veracruz, Mexico, where it is known from at least one protected region and has been collected recently; it does not appear to be currently at risk; Daniel 1990b, 2004c),

Spathacanthus hahnianus (although very rare or possibly extirpated in Guatemala, where known only from an 1886 type collection, the species is known by recent collections from various localities both in Mexico and Honduras; the species is not at risk at present; Daniel 1999b, 2005),

Stenandrium dulce (although known from only a few collections in two departments of Guatemala, this species is widespread, often locally abundant, and found in several biotic communities from the southern USA to Chile; it is not at risk; Daniel 1985),

S. subcordatum (although rarely collected in Guatemala and known from a single department, it was collected there as recently as 1992; the species is more abundant, and has been recently collected in the Yucatan Peninsula of Mexico; it would not appear to be at risk at present; Daniel 1985, 2008),

Stenostephanus latilabris (known from a recent collection from one department and historical collections from two others in Guatemala and from a small region in Chiapas, Mexico where last collected in 1989; although the 2010 collection from San Marcos came from a population of several hundred plants, the overall conservation status of the species remains unknown; Daniel 1999c), and

Tetramerium tenuissimum (known from more than 50 collections, many of them recent, from northern Mexico to El Salvador; the species is not at risk; Daniel 1986, 2001, 2004b).

By contrast, the sixteen species of Acanthaceae endemic to Guatemala are represented nowhere else, and their conservation status is of greater concern. Notes relevant to the conservation status of each of them are provided in the species accounts below. At least six of these Guatemalan endemics (*Justicia pedicellata, J. velizii, Odontonema steyermarkii, Poikilacanthus skutchii, Stenostephanus azureus*, and *S. ruberrimus*) appear to be extant (based on a collection made in the past 20 years) and known from sufficient collections and localities that they do not appear to be in imminent danger of extinction. On the other hand, 10 species (*Dicliptera debilis, D. guttata, Justicia gibsoniae, J. neomontana, J. sangilensis, J. silvicola, J. steyermarkii, J. viridescens, J. williamsii*, and *Poikilacanthus pansamalanus*) are rare and/or have not been collected within the past two decades. Some of these are rare, but extant (as of 2009): *D. guttata, J. sangilensis, J. viridescens*, and *J. williamsii*. For the others, their status is unknown. They remain known only by their respective type (including paratype) collections, made between 67 and 123 years ago. Attempts to relocate these species will undoubtedly provide useful information as to whether they remain extant or not. It should be noted that for species here considered rare (based on the criterion noted above) population sizes have usually not been estimated, and the absence of additional collections of them might reflect inadequate sampling rather than actual rarity. Indeed, the chances of relocating some or all of the endemics that have not been collected in the past 20 years appears promising based on the successful results of our attempts to relocate *Dicliptera guttata* and *Justicia williamsii* (both of which were known only from their respective types) in 2009.

Although Acanthaceae are widespread in Guatemala, and occur in diverse plant communities, several regions are noteworthy because they harbor both endemic and high numbers of non-endemic species of the family. These "hotspots" include: Sierra de los Cuchumatanes in Huehuetenango, Montañas del Mico (particularly the Cerro San Gil) and the lowland rain forests surrounding the Bahía de Gálvez (Bahía de Santo Tomás) in Izabal, Sierra de Chamá and the vicinity of Pansamalá in Alta Verapaz, Sierra de las Minas in several departments, slopes of Volcán Zunil in Quetzaltenango, montane slopes above San Rafael Pie de la Cuesta in San Marcos, and the vicinity of La Cumbre in southeastern Petén. Several of these regions were noted by Véliz (2008) as having a high incidence of endemism for Guatemalan plants. Some of these regions currently have or include protected areas (e.g., Sierra de las Minas, Cerro San Gil; CONAP 2007). Among those departments with high numbers of Acanthaceae, Petén and Izabal have numerous, large protected areas whereas Huehuetenango has few and relatively small ones (CONAP 2007; Castañeda 2008). Ultimately, to maintain the richness and diversity of Guatemalan Acanthaceae, preservation of diverse biotic communities throughout the nation will be necessary.

TAXONOMIC CATALOG

***Aphelandra aurantiaca* Lindl.**

RECENT DESCRIPTIONS.— Daniel (1991a, 1995b).

PHENOLOGY.— Flowering: throughout the year; fruiting: January–June.

HABITATS.— Lowland rain forests, montane rain forests, mesophytic forests, tall forests, short forests, zapotales, montane ridges and summits, clearings, along streams, ravines; 0–1350 m.

LOCAL NAME.— "Flor de rosario" (*Johnson 67*).

Alta Verapaz: *von Tuerckheim 8254* (F, US). **Baja Verapaz**: *von Tuerckheim 3942* (US). **Huehuetenango**: *Steyermark 49248* (F, MICH, US). **Izabal**: *Steyermark 41685* (F). **Petén**: *Tún Ortíz 1826* (F, MO).

Gibson (1974) recognized *A. repanda* Nees as distinct from *A. aurantiaca*; Daniel (1995b) treated them as conspecific.

***Aphelandra gigantiflora* Lindau**

RECENT DESCRIPTIONS.— Daniel (1991a, 1995b).

PHENOLOGY.— Flowering: November–March; fruiting: February.

HABITATS.— Moist to wet forests, wooded ravines; 425–1200 m.

Chimaltenango: *Johnston 1549* (F). **Escuintla**: *Standley 89506* (holotype of *A. gigantiflora* f. *lutea* Standl. & Steyerm.: F). **Guatemala**: *Donnell-Smith 2696* (US). **Sacatepéquez**: *Standley 58132* (F, US).

Gibson (1974) treated this taxon as a variety of *A. schiedeana*; Daniel (1991a) treated it as a distinct species. The type of *A. gigantiflora* (*Warscewicz s.n.* at GH) was presumably collected from an unknown locale in Guatemala. Although the specimen indicates "Guatemala et Costarica," the species is not known from the latter nation. A yellow-flowered form of the species, based on Guatemalan plants noted above, was not treated as distinct by either Gibson (1974) or Daniel (1991a).

***Aphelandra heydeana* Donn. Sm.**

RECENT DESCRIPTIONS.— Daniel (1991a, 1995b).

PHENOLOGY.— Flowering: September–December; fruiting: February.

HABITATS.— Moist to wet forests, cloud forests, oak woodland/pastures, thickets; 1060–1800 m.

LOCAL NAME.— "Flor de S. Julián" (*Morales R. 1175*)

Guatemala: *Davidson 3249* (ENCB, F, MO, RSA). **Huehuetenango**: *Madison 1769* (GH). **Santa Rosa**: *Heyde & Lux 4037* (holotype: US; isotype: MO).

***Aphelandra scabra* (Vahl) Sm.**

RECENT DESCRIPTIONS.— Daniel (1991a, 1995b).

PHENOLOGY.— Flowering: throughout the year; fruiting: November–June.

HABITATS.— Moist evergreen forests, tropical deciduous forest-oak forest transition, pine forests, dry forests, tall forests, short forests, zapotales, moist thickets, dry thickets, savannas with trees and shrubs, wet cliffs, ravines, brushy slopes, disturbed sites (e.g., roadsides, cafetales); 0–1850 m.

LOCAL NAMES.— "Chacanal" (*Veintimilla & César 10205*), "flor de San Julián" (*Pérez 274*), "sic chá" (*Goll 3*), "tintillo" (*de Castillo s.n.* 23 III 1947).

Alta Verapaz: *Steyermark 45603* (F). **Baja Verapaz**: *Daniel & Véliz 11329* (BIGU, CAS, MO). **Chimaltenango**: *Johnston 567* (F). **Chiquimula**: *Molina R. & Molina 26782* (F, MICH). **El Progreso**: *García & Cóbar MG882* (BIGU, MO, USCG). **Escuintla:** *Velasquez s.n.* (holotype of *Justicia rostrata* Bertol.: BOLO). **Guatemala**: *Standley 59601* (F). **Huehuetenango**: *Williams et al. 41247* (F, US). **Izabal**: *Contreras 5959* (F, LL, MO). **Jalapa**: *Standley 77087* (US). **Jutiapa**: *Standley 75121* (F, US). **Petén**: *Contreras 7017* (F, MO, US). **Quezaltenango**: *Skutch 1370* (F, US). **Quiché**: *Aguilar 1054* (F). **Retalhuleu**: *Standley 87650* (F, US). **Santa Rosa**: *Standley 78702* (F, US). **Sololá**: *Shannon 154* (US). **Suchitepéquez**: *Standley 62184* (F, US). **Zacapa**: *Steyermark 42150* (F, US).

Gibson (1974) treated this species with the name *A. deppeana* Schlecht. & Cham., a taxonomic synonym (see Daniel 1991a). This is one of the most widespread (occurring in wet to dry habitats) and conspicuous of acanthaceous shrubs in Central America; it is commonly collected.

***Aphelandra schiedeana* Schlecht. & Cham.**

Recent descriptions.— Daniel (1991a, 1995b).

Phenology.— Flowering: October–March; fruiting: December–March.

Habitats.— Moist to wet forests, moist evergreen montane forests, cloud forests, slopes, along streams; 600–2440 m.

Chimaltenango: *Daniel & Véliz 11201* (BIGU, CAS, K, MO). **Escuintla**: *Standley 61283* (F). **Guatemala**: *MacVean & Escobar 1027* (UVAL). **Huehuetanango**: *Véliz et al. 16058* (BIGU). **Quezaltenango**: *Standley 83352* (F, US). **Quiché**: *Skutch 1724* (F, US). **Sacatepéquez**: *Daniel & Véliz 11200* (BIGU, BR, CAS, K, MO, US). **San Marcos**: *Daniel et al. 11314* (BIGU, CAS, MO).

***Aphelandra speciosa* Brandegee**

Recent descriptions.— Daniel (1991a, 1995b).

Phenology.— Flowering: January, May–October; fruiting: March, July, October.

Habitats.— Moist to wet forests, mixed forests; 900–1800 m.

Local names.— "Crucita de mayo" (*de Castillo 2722*), "flor de la Santa Cruz de mayo" (*Steyermark 33415*); "flor de mayo" (*Steyermark 37220*).

Quezaltenango: *Steyermark 33415* (F). **San Marcos**: *J. Morales et al. 528* (F, USCG). **Suchitepéquez**: *Steyermark 46800* (F, US).

***Asystasia gangetica* (L.) T. Anders.**

Recent Description.— Daniel and Figueiredo (2009).

Phenology.— Flowering: January; fruiting: unknown.

Habitats.— Disturbed sites (e.g., roadsides); ca. 25 m.

Izabal: *Daniel et al. 11242* (CAS).

This native of Africa and southern Asia was recently found to be naturalized in a region of lowland rain forest. It has been reported from elsewhere in Central America (e.g., Belize, Honduras, Nicaragua, Costa Rica, Panama; Durkee 1978, 1986, 2001; Daniel 1997a, 2005).

***Avicennia germinans* (L.) Stearn**

Recent descriptions.— Pool (2001), Correll and Correll (1982).

Phenology.— Flowering: March–August; fruiting: March, August–September.

Habitats.— Salt marshes, tidal flats, mangrove swamps, esturine borders; at or near sea level (–200 m [?]) on both Pacific and Caribbean coasts.

Local names.— "Ixtaten" (*Lara s.n.*), "madre sal" (*Arrecis 47*), "mangle blanco" (*Véliz & Véliz 94.4076*); "mangle negro" (*Arrecis 121*).

Escuintla: *Véliz & Véliz 94.4076* (BIGU). **Izabal:** *Standley 72167* (F). **Jutiapa**: *Arrecis 121* (BIGU, USCG). **Retalhuleu**: *Arrecis s.n.* III-1995 (BIGU). **San Marcos**: *Arrecis 50* (USCG). **Santa Rosa**: *Lara s.n.* (USCG).

Avicennia is usually treated either in Verbenaceae (e.g., Gibson 1970) or Avicenniaceae. Molecular phylogenetic studies (Schwarzbach and McDade 2002; McDade et al. 2008) reveal it to be nested among Acanthaceae s.l., and either related to *Thunbergia* and *Mendoncia* of subfamily Thunbergioideae or sister to subfamily Acanthoideae. As noted by Jarvis (2007), "there has been disagreement over the correct name for this taxon—see Little (in *Phytologia* 8:49–57. 1961) who argued that it should be *A. nitida* Jacq., and Compère (in *Taxon* 12:150. 1963) who favoured *A. germinans* (L.) L."

The black mangrove is often an abundant shrub or tree of tropical shorelines and coastal swamps where it is an important constituent of mangrove communities. Pneutomatophores (aerial, pencil-like roots evident at least at low tide) and viviparous seeds (that swell and can germinate prior to falling) are characteristic of the genus. Gibson (1970:179) noted that the flowers are reputed "to be much visited by bees and to supply a good grade of honey." Some of the economic uses of *A. germinans* were summarized by Cheatham et al. (2000).

In addition to the coastal departments noted above, the species likely occurs or occurred along the coasts of Quezaltenango and Suchitepéquez as well. *Avicennia germinans* also occurs in the southern USA (Florida and Texas) and throughout coastal regions of the West Indies, Mexico, Central America, the Galapágos Islands, and the Pacific coast of South America (to Peru). It also occurs on the Carribean and Atlantic coasts of South America (possibly to northern Brazil), where it distribution and taxonomy become entangled with *A. schaueriana* Stapf & Leechman ex Moldenke. Plants of western Africa are sometimes referred to *A. africana* Beauvois (e.g., Moldenke 1960), but are usually treated as *A. germinans* (e.g., Gibson 1970; Stearn 1958; Tomlinson 1986; Daniel and Figueiredo 2009). Moldenke (1960) treated *A. germinans* as a strictly American species and provided an account of it that included a description, discussion, and list of specimens; he also listed numerous additional synonyms and illustrations he believed to be referable to the species.

Pollen of *A. germinans* from Africa (*Daniel 11120*) and tropical America (*Daniel 9478*) shows similar patterns of variation: shape varying from spheric to ± prolate and apertures varying from 3-colpate to 3-colpoidate to 3-colporate (Fig. 5).

Gibson (1970) included *Avicennia bicolor* Standl. in her account of the Guatemalan taxa because of its expected occurrence in the country. Although it occurs in surrounding regions (e.g., Chiapas, El Salvador, and Honduras), this species has not yet been documented from Guatemala. In Mexico and Central America, the two species can be distinguished using the following couplet:

1. Inflorescence of ± open panicles of spikes, pairs of flowers (3–) 4.5–9 mm distant along rachis, rachis clearly visible between pairs; corolla 4.5–6 mm long, lobes internally glabrous; leaves elliptic to broadly elliptic, 1.4–2.6 × longer than wide; young stems lacking a whitish covering of pubescence . . . . *A. bicolor*
1. Inflorescence of densely flowered spikes, pairs of flowers congested at or toward apex of rachis, 1.5–4 mm distant, rachis often not or but barely visible between pairs; corolla 5–7.5 mm long, lobes internally pubescent; leaves lance-elliptic to narrowly elliptic to elliptic (to obovate), (2.1–) 2.5–6.4 × longer than wide; young stems with a whitish covering of pubescence . . . . *A. germinans*

***Barleria oenotheroides* Dum. Cours.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: August–January; fruiting: January–May, October.

HABITATS.— Moist forests, short forests, tall forests, ramonales, along streams, thickets, clearings; 250–1700 m.

Baja Verapaz: *Daniel & Véliz 11330* (BIGU, CAS, MO). **Chiquimula**: *Molina R. & Molina 25327* (F). **Escuintla**: *Standley 89497* (F, US). **Huehuetenango**: *Williams et al. 41380* (F). **Izabal**: *Lundell & Contreras 18900* (LL, MO, US). **Petén**: *Contreras 7482* (F, MO, US). **Santa Rosa**: *Heyde & Lux 3117* (US).

Gibson (1974) treated this species with the name *B. micans* Nees, a taxonomic synonym (see Daniel 1995a).

***Bravaisia berlandieriana* (Nees) T.F Daniel**

Recent Description.— Daniel (1988).

Phenology.— Flowering: April; fruiting: April–May.

Habitats.— Shorelines or areas subject to inundation; 50–80 m.

Local name.— "Juluba" (*Morales et al. 150*).

Petén: *Contreras 8369* (LL, MO, US).

Gibson (1974) treated this species with the name *B. tubiflora* Hemsl., a taxonomic synonym (see Daniel 1988). Although uncommon in Guatemala, this species is widespread and locally abundant in Belize and Mexico. Flowers of the three species of *Bravaisia* are shown in Figure 2.

***Bravaisia grandiflora* Donn. Sm.**

Recent descriptions.— Daniel (1988, 1995b).

Phenology.— Flowering: February–April; fruiting: unknown.

Habitats.— Tall forests, along streams; 180–850 m.

Local name.— "Boc-che'" (*Johnson 187*; Keckchí dialect).

Alta Verapaz: *von Tuerckheim 7924* (holotype: US). **Huehuetenango**: *Lopez 4* (USCG). **Izabal**: *Tún Ortíz 2351* (BM, F, MICH, US). **Petén**: *Contreras 6695* (K, LL, MO, US).

***Bravaisia integerrima* (Spreng.) Standl.**

Recent descriptions.— Daniel (1988, 1995b).

Phenology.— Flowering: March; fruiting: March.

Habitat.— Unknown; elevation unknown.

Department undetermined: *Bernoulli & Cario 2042* (K, MO).

Gibson (1974) did not note the occurrence of this species in Guatemala, but it was included from the country by Daniel (1988). The locality of Bernoulli and Cario's collection was illegibly written on the specimen label as either "Guaumitul" or "Guarunthal." Parker (2008:13) indicated that the species is "probably found in the Petén." Because of the general occurrence of *B. integerrima* along the Pacific coast in Central America, it is more likely that it occurs (or formerly occurred) in southern Guatemala, near the Pacific coast. The species, though possibly extirpated in Guatemala, is widespread and locally abundant in other regions of Mexico and Central America, where it occurs in lowland swamps, leeward margins of mangrove communities, and palm forests at elevations below 300 meters.

***Carlowrightia arizonica* A. Gray**

Recent descriptions.— Daniel (1983, 1995b, 1997b).

Phenology.— Flowering: January–March, October; fruiting: January–March, October.

Habitats.— Tropical deciduous forest, moist thickets, along arroyos, disturbed sites; 180–400 m.

Chiquimula: *Standley 74521* (F, NY, US). **El Progreso**: *Daniel et al. 11215* (BIGU, CAS, K, MO). **Zacapa**: *Kellerman 7947* (F).

Gibson (1974) treated this species as *C. costaricana* Leonard, a taxonomic synonym (see Daniel 1983). *Carlowrightia arizonica* is represented by diverse forms throughout its broad range (Daniel 1983, 1995b, 1997b). Plants from Guatemala have inflorescences consisting of elongate and ± weak spikes, dichasia that are alternate and ± secund, and rachises that are ± evenly pubescent with the pubescence mostly or entirely eglandular and varying from puberulent (trichomes erect to retrorse and up to 0.1 mm long) to ± hirsute (with overstory trichomes flexuose to retrorse and up to 0.3 mm long). Although uncommonly collected in Guatemala, the species is locally abundant in dry regions of the country.

Chileranthemum pyramidatum **(Lindau) T.F. Daniel**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: January, August–October; fruiting: December.

Habitats.— Dry forests, brushy and rocky slopes; 500–1060 m.

Huehuetenango: *Seler & Seler 3276* (holotype of *Trybliocalyx pyramidatus* Lindau: B, destroyed). **Zacapa:** *Standley 73793* (holotype of *Clerodendrum standleyi* Moldenke: NY; isotype: F).

Gibson (1974) treated this species as *Trybliocalyx pyramidatus*, a nomenclatural synonym, and *T. albicaulis* (Brandegee) D.N. Gibson, a taxonomic synonym (see Daniel 1995a). Although the species has been collected only sporadically in Guatemala, it was collected as recently as 2008 in Huehuetenango (e.g., *Véliz and Velásquez 19326* at BIGU). Habitat data for Guatemalan plants is not well documented. In Chiapas, this species occurs in pine-oak forests at higher elevations, and elsewhere in Mexico (e.g., Oaxaca), it is known from arid regions at lower elevations.

Dicliptera antidysenterica **A. Molina R., Ceiba 11:65. 1965.** Type.— HONDURAS. **Santa Bárbara**: eastern forested slopes of Cerro Sta. Bárbara, 2100 m, 4 April 1951, *P. Allen et al. 6056* (see discussion).

Perennials. Young stems subhexagonal to subquadrate-rounded to ± flattened, pubescent with mostly retrorse to retrorsely appressed eglandular trichomes 0.1–0.3 mm long, trichomes concentrated in (or ± restricted to) 2 vertical lines. Leaves petiolate, petioles to 72 mm long, blades ovate-elliptic to elliptic, 40–157 mm long, 20–73 mm wide, 2–2.1 times longer than wide, acuminate at apex, subattenuate at base, surfaces pubescent (especially on major veins) with flexuose to antrorse eglandular trichomes. Inflorescence of pedunculate cymes clustered in axils of leaves (especially distal leaves), collectively forming a ± dense thyrsoid unit to 65 mm long and to 30 mm in diameter near midpoint, rachis of thyrsoid unit pubescent like young stems (or with denser trichomes); cymes 1–4 per axil, opposite at nodes, peduncles to 12 mm long (those in an axil sometimes fused for several mm proximally), pubescent like young stems; paired bracts subtending cymes lanceolate, 4.5–11 mm long, 1.2–2.5 mm wide, abaxial surface sparsely pubescent with antrorsely appressed eglandular trichomes to 0.2 mm long to nearly glabrous, margin ciliate with sparse flexuose eglandular trichomes to 1 mm long; cymules 3–7 per cyme, subsessile (i.e., with peduncles to 1 mm long). Outer cymule bracteoles elliptic (smaller of the pair) to obovate (larger of the pair), those of a pair subequal to unequal in size, 7–12.5 mm long (the longer one 1.3–1.7 times longer than the shorter one), 1.8–4.5 mm wide, acute and apiculate at apex with apiculum (sometimes with an inconspicuous mucro) to 0.3 mm long, abaxial surface ± inconspicuously pubescent with antrorsely appressed eglandular trichomes 0.1–0.3 mm long, adaxial surface pubescent with antrorse eglandular trichomes (and sometimes with inconspicuous glandular trichomes to 0.2 mm long), margin ciliate with conspicuous flexuose eglandular trichomes 0.3–1 mm long. Inner cymule bracteoles lanceolate to lance-elliptic, 6–6.5 mm long, 1–1.3 mm wide, pubescent like outer cymule bracteoles. Flowers sessile. Calyx 4–4.3 mm long, lobes lance-subulate, 3–3.3 mm long, abaxially pubescent like outer cymule bracteoles. Corolla resupinate 180°, cream white with faint maroon markings on lip in posterior position (based on Honduran collections), 14–20 mm long, externally pubescent with flexuose eglandular and glandular (sometimes very sparse) trichomes 0.2–0.7 mm long, tube 6–8 mm long, 1.5–1.8 mm in diameter near midpoint, lips 7.5–12 mm long. Stamens 10–11.5 mm long, filaments pubescent with eglandular trichomes, thecae dehiscing toward upper lip, 1.3–1.5 mm long, subequal in size (distal one slightly longer), subparallel, unequally inserted but overlapping. Style 15–16 mm long, pubescent (at least proximally) with eglandular trichomes, stigma lobes equal, 0.5 mm long. Capsules (based on Honduran collections) 6.5–7.5 mm long, pubescent with flexuose glandular (especially near apex) and eglandular trichomes 0.1–0.5 mm long.

PHENOLOGY.— Flowering: May; fruiting: unknown.

HABITAT.— Unknown; 350 m.

Alta Verapaz: *von Tuerckheim 8256* (CAS, MO, NY, US).

In the protologue *Allen et al. 6056* at F is cited as the holotype and a duplicate at EAP is cited as an isotype. No collection with this number has been located at these (or other) herbaria. *Allen et al. 6054*, collected at the same time and place, was also listed (i.e., a paratype) in the protologue. All collections I have seen (EAP, F, US) are numbered 6054 and the collection at EAP bears Molina's annotation as "tipo". *Allen et al. 6054* at F was annotated as a "cotype" by Molina. Thus, either *Allen et al. 6056* has been lost or destroyed, and a neotype might be designated, or citation of *Allen et al. 6056* in the protologue was erroneous and *Allen et al. 6054* was intended as the type.

The inflorescences contain no true stipitate glandular trichomes (except on adaxial surface of cymule bracteoles); some of the eglandular trichomes have dark colored septae or bulbous bases that can superficially appear as glandular trichomes but they are not gland-tipped trichomes.

Gibson (1974) treated this species and the Guatemalan plants as *D. sumichrasti* Lindau, a species described from Veracruz, Mexico. Although in many characteristics the type of that species resembles Guatemalan plants, the latter more closely resemble *D. antidysenterica* from Honduras. Daniel (2005) noted distinctions between *D. sumichrasti* and *D. antidysenterica*. The description above pertains only to Guatemalan plants (except as noted), which greatly resemble those from Honduras. The species is either rare or possibly extirpated in Guatemala, it is known from several regions of Honduras where it occurs along streams and trails in moist forests.

Although Guatemalan species of *Dicliptera* are imperfectly known, they can be distinguished by the following key:

1. Outer cymule bracteoles ovate to deltate . . . . *D. inutilis*
1. Outer cymule bracteoles neither ovate nor deltate.
    2. Corolla 12–20 mm long.
        3. Cymules pedunculate, peduncles (7-) 10–38 mm long; outer cymule bracteoles elliptic to circular, those of a pair equal in size; corolla externally pubescent with eglandular trichomes only; capsule glabrous . . . .*D. thlaspioides*
        3. Cymules sessile to subsessile, peduncles (if present) to 2 mm long; outer cymule bracteoles elliptic to obovate to oblanceolate to spatulate, those of a pair equal to unequal in size; corolla externally pubescent with eglandular and glandular trichomes; capsule pubescent.
            4. Cymes alternate (i.e., in only one axil per node); outer cymule bracteoles equal to subequal in size (one 1–1.3 × longer than the other); calyx 5.2–7 mm long . . . .*D. membranacea*
            4. Cymes opposite (i.e., in both axils per node); outer cymule bracteoles subequal to unequal (one 1.3–1.7 × longer than the other); calyx 1.7–4.3 mm long.
                5. Inner cymule bracteoles lanceolate to lance-elliptic, 6–6.5 mm long; calyx 4–4.3 mm long; corolla white with maroon markings; thecae 1.3–1.5 mm long; capsule 6.5–7.5 mm long . . . . *D. antidysenterica*
                5. Inner cymule bracteoles lance-subulate, 2–4 mm long; calyx 1.7–3 mm long; corolla rose-pink with white markings; thecae 0.8–1.3 mm long; capsule 3–4.8 mm long . . . . *D. unguiculata*

2. Corolla 24–36 mm long.
    6. Inflorescence usually of ± spikelike axes (or panicles of ± spikelike axes) bearing alternate (i.e., in only one axil per node), secund, and sessile to subsessile cymes bearing a single sessile to subsessile cymule; inner cymule bracteoles 3—5 mm long; calyx 2.5–3.2 mm long; corolla externally pubescent with eglandular trichomes; thecae 1.8–2.7 mm long . . . .*D. sexangularis*
    6. Inflorescence otherwise, cymes (alternate or) opposite at nodes, sessile to pedunculate, and usually bearing 3 or more sessile to pedunculate cymules; inner cymule bracteoles 6–13 mm long; calyx 5–9 mm long; corolla externally pubescent with eglandular and usually glandular trichomes; thecae 1–1.8 mm long.
        7. Cymules pedunculate, peduncles 5–73 mm long; corolla red or orangish; capsule 9–11 mm long . . . .*D. sciadephora*
        7. Cymules sessile to subsessile, peduncles (if present) to 2 mm long; corolla pale red, pink-red, or salmon-colored; capsule 5–9 mm long.
            8. Young stems ± 2-fariously pubescent; calyx 6–8 mm long; capsule 7.5–9 mm long, pubescent with glandular trichomes . . . . *D. debilis*
            8. Young stems ± evenly pubescent; calyx 8–8.5 mm long; capsule 5–5.5 mm long, pubescent with eglandular and glandular trichomes . . . . *D. guttata*

***Dicliptera debilis* Leonard, J. Wash. Acad. Sci. 31:99. 1941.** Type.— GUATEMALA. **Baja Verapaz**: dry rocky hills N of Sta. Rosa in forest of pine and oak, 30 Mar 1939, *P. Standley 69823* (holotype: F!; isotype: US!).

Perennial herbs to 1.2 m tall. Young stems hexagonal, ± 2-fariously pubescent with erect to flexuose to retrorse eglandular trichomes 0.2–0.7 mm long. Leaves petiolate, petioles to 10 mm long, blades ovate, 18–48 mm long, 6–23 mm wide, 2.2–3 times longer than wide, acute to subacuminate at apex, acute to subattenuate at base, surfaces sparsely pubescent especially along midvein with eglandular and mostly antrorse trichomes. Inflorescence of cymes of cymules in leaf axils or terminating shoots; cymes 1–2 per axil, opposite at nodes, subsessile to pedunculate, peduncles of axillary cymes 1–10 (-16) mm long, ± evenly to 2-fariously pubescent with cauline type trichomes; paired bracts subtending cymes triangular-lanceolate to ovate to elliptic to obovate, 2.5–5.5 mm long, 1.5–2 mm wide, apex ± constricted-caudate, abaxial surface and margin pubescent with cauline type trichomes; cymules 3–4 per cyme, subsessile, peduncles to 2 mm long. Outer cymule bracteoles oblanceolate to obovate to elliptic, those of a pair subequal to unequal in size, 7–17 mm long (the longer one 1.2–1.9 times longer than the shorter one), 1.5–6.5 mm wide, rounded and ± apiculate at apex with apiculum to 0.4 mm long, abaxial surface and margin pubescent with flexuose to antrorse eglandular trichomes 0.2–0.4 mm long and usually with erect to flexuose subglandular to glandular trichomes 0.05–0.1 mm long (sometimes sparse and especially evident on margin) as well. Inner cymule bracteoles linear-lanceolate, 6–9 mm long, 0.7–1 mm wide, abaxial surface puberulent with erect subglandular to glandular and eglandular trichomes less than 0.1 mm long. Flowers sessile. Calyx 6–8 mm long, lobes lance-subulate, 4.5–7 mm long, abaxially pubescent like inner cymule bracteoles. Corolla resupination unknown, pale red, 27–32 mm long, externally pubescent with erect to flexuose glandular and eglandular trichomes 0.05-0.3 mm long, tube 18–21 mm long, 1.5–2.2 mm in diameter near midpoint, upper lip 8-11 mm long, lower lip 7-11 mm long, 3-lobed, lobes 0.4-0.5 mm long, 0.2-0.5 mm wide. Stamens 15 mm long, thecae with direction of dehiscence unknown, 1–1.2 mm long, subequal in size, parallel, unequally inserted to ± superposed (contiguous). Style 25 mm long, sparsely pubescent with eglandular trichomes, stigma subcapitate. Capsule 7.5–9 mm long, pubescent with erect to flexuose glandular trichomes 0.1–0.2 mm long. Seeds sublenticular, 2–2.5 mm long, 1.7–2 mm wide, surfaces ± roughened or ridged, lacking trichomes.

PHENOLOGY.— Flowering: March; fruiting: March.

HABITAT.— Pine-oak forests, dry and rocky hills; elevation ca. 1500 m.

Baja Verapaz: *P. Standley 69823* (type, see above).

This poorly known and characterized species is endemic to Guatemala (Baja Verapaz), where it either rare or extinct. It is known only from the type, which was collected 70 years ago, and another collection from the same general region obtained two years later (rocky hills near and above Santa Rosa, pine-oak forest, ca. 1500 m, 4 Apr 1941, *Standley 91106* at F). Leonard (1941) provided an illustration of *D. debilis* in the protologue.

***Dicliptera guttata* Standl. & Leonard in P.C. Standley and J.A. Steyermark, Publ. Field Mus. Nat. Hist., Bot. 23:239. 1947.** TYPE.— GUATEMALA. **Zacapa**: Sierra de las Minas, along Rillito de Volcán de Monos, Volcán de Monos, 1150–2100 m, 10 Jan 1942, *J. Steyermark 42396* (holotype: US! isotype: F! GH).

Shrubs to 1.5 m tall. Young stems quadrate-sulcate to hexagonal, ± evenly pubescent with flexuose to retrorse eglandular trichomes 0.2–1 mm long. Leaves petiolate, petioles to 50 mm long, blades ovate to ovate-elliptic, 30–108 mm long, 11–48 mm wide, 1.8–3.6 times longer than wide, acute to acuminate at apex, (rounded to) acute to subattenuate at base, surfaces pubescent with flexuose to antrorse eglandular trichomes. Inflorescence of cymes of cymules in axils of distal leaves; cymes 1 (–2) per axil, alternate or opposite at nodes, sessile (distally) to pedunculate (proximally), peduncles (if present) to 33 mm long; paired bracts subtending cymes often recurved (especially distally), lance-subulate to linear to oblanceolate or sometimes subfoliose to foliose (proximally), 4–14 (–55) mm long, 0.8—4 (–17) mm wide, abaxial surface pubescent with flexuose to antrorse eglandular trichomes, margin ciliate with flexuouse eglandular trichomes to 0.5 mm long; cymules usually 3 per cyme, sessile. Outer cymule bracteoles tinged reddish distally, elliptic to obovate, those of a pair unequal in size, 9–19 mm long (the longer one 1.4–1.7 times longer than the shorter one), 3–12 mm wide, acute to rounded and submucronate to apiculate at apex with apiculum/mucro to 0.2 mm long, abaxial surface pubescent with erect to antrorse eglandular trichomes 0.2–0.9 mm long and sometimes with an inconspicuous understory of erect glandular trichomes 0.05–0.2 mm long (especially at or near apex), adaxial surface similarly pubescent except glands sometimes more conspicuous, margin ciliate with conspicuous erect to flexuose eglandular trichomes to 1.8 mm long (and sometimes with glands like those of surfaces). Inner cymule bracteoles linear-lanceolate to lanceolate, 6–10 mm long, 0.5–1.2 mm wide, pubescent like outer cymule bracteoles. Flowers sessile. Calyx 8–8.5 mm long, lobes lance-subulate, 6–7.5 mm long, abaxially pubescent like inner cymule bracteoles. Corolla not resupinate, pale pink-red or salmon colored, 24–34 mm long, externally pubescent with erect to flexuose eglandular and glandular trichomes 0.1–0.4 mm long, tube 16–23 mm long, 2.2–3 mm in diameter near midpoint, upper lip 7.5–12 mm long, lower lip 8–14.5 mm long, 3-lobed, lobes 0.1–0.2 mm long, 0.3–0.5 mm wide. Stamens 17–21 mm long, inserted near midpoint of corolla tube, filaments sparsely pubescent with eglandular trichomes, thecae dehiscing toward lower lip, 1–1.5 mm long, subequal to equal in size, subparallel to perpendicular, superposed (contiguous or with a gap 0.1–0.4 mm). Style 25–36 mm long, sparsely pubescent proximally with eglandular trichomes, stigma 0.1–0.2 mm long. Capsules 5–5.5 mm long, pubescent with flexuose to retrorse eglandular and glandular trichomes 0.2–0.6 mm long. Seeds not seen.

Phenology.— Flowering: January; fruiting: January.

Habitat.— Oak-pine forests, moist draws; 1330 m.

Zacapa: *Daniel et al. 11226* (BIGU, BR, CAS, F, K, MICH, MO, US).

Dicliptera guttata is endemic to Guatemala (Zacapa), and Standley and Steyermark (1947) provided an illustration of it in the protologue. Prior to this study, it was known only from the type collection. During field-work in 2009 the species was rediscovered in the Sierra de las Minas, possibly at or near the type locality. *Daniel et al. 11226* was seen only at an elevation of 1330 meters where about 10 plants were encountered. Flowers of plants in this population were actively visited by hummingbirds. The Sierra de las Minas is well known for richness and endemism of plant species; about 2000 species have been recorded from the range, and at least 70 of them are endemic there (Dix 1997). The locale of *Daniel et al. 11226* appears to be within the boundaries of the Reserva de Biosfera Sierra de las Minas. At the present time, this species should be considered as rare.

***Dicliptera inutilis* Leonard, J. Wash. Acad. Sci. 31:101. 1941.** Type.— GUATEMALA. **Jutiapa**: Los Llanitos near San José Acatempa, ca. 1200 m, 21 Dec 1930, *P. Standley 60579* (holotype: F!).

Perennial herbs to 1.2 m tall. Young stems hexagonal, ± evenly pubescent with flexuose to antrorse to retrorse eglandular trichomes 0.1–0.3 mm long. Leaves petiolate, petioles to 14 mm long, blades ovate, 22–57 mm long, 8–24 mm wide, 1.8–2.8 times longer than wide, acuminate at apex, acute to subattenuate at base, sparsely pubescent with eglandular trichomes to nearly glabrous. Inflorescence of cymes of cymules in leaf axils; cymes 1 per axil, alternate or opposite at nodes, pedunculate, peduncles 1–2.5 mm long; paired bracts subtending cymes ± recurved, linear to obovate to oblanceolate, 2–9 mm long, 0.3–2.5 mm wide, abaxial surface sparsely pubescent with antrorse eglandular trichomes, margin sparsely ciliate (if at all) with erect eglandular trichomes to 0.1 mm long; cymules 2–3 per cyme, pedunculate, peduncles 1.5–3 mm long. Outer cymule bracteoles ovate to deltate, those of a pair subequal to unequal in size, 10–24 mm long (larger one 1.1–1.3–1.4 × longer than shorter one), 6–16 mm wide, rounded to acute and submucronate at apex, abaxial surfaces pubescent with antrorse eglandular trichomes 0.05–0.1–0.3 mm long and usually inconspicuously puberulent with inconspicuous erect glandular trichomes to 0.05 mm long, margin inconspicuously ciliate with antrorse eglandular trichomes to 0.2 mm long. Inner cymule bracteoles lance-linear, 2.5–4–5–5.2 mm long, 0.5–1 mm wide, abaxial surface pubescent like outer bracteoles except with glandular trichomes more conspicuous. Flowers sessile. Calyx 5.2–5.7 mm long, lobes lance-subulate to lanceolate, 3–4 mm long, abaxially pubescent like inner cymule bracteoles. Corolla (not seen at maturity) "rose-purple," buds externally pubescent with erect to flexuose eglandular trichomes 0.1–0.3–0.4 mm long and sometimes with erect glandular trichomes to 0.1 mm long as well. Staminal filaments pubescent with eglandular trichomes, thecae 1–1.1 mm long, equal in size, parallel to subparallel, superposed (contiguous). Style sparsely pubescent with eglandular trichomes, stigma lobes 0.2 mm long. Capsules (immature) 5 mm long, pubescent with erect to flexuose to retrorse eglandular trichomes 0.1–0.4 mm long. Seeds not seen.

Phenology.— Flowering: December–February; fruiting: February.

Habitat.— Moist thickets; ca. 1200 m.

Jutiapa: *Standley 60579* (type, see above). **Retalhuleu**: Champerico, *Johnston 1739* (F).

This is one of several Guatemalan species of *Dicliptera* that are known from limited materials and are poorly characterized. Presumably, *Johnston 1739* represents the same taxon as the type, but based on the condition of each collection this is not certain. These plants were collected in different regions of the country and there are some minor differences between them (e.g., outer cymule bracteoles subequal in size and acute at apex on type vs. unequal in size and rounded-submucronate at apex on *Johnston 1739*). Both are included in the description above.

Dicliptera inutilis is nearly endemic to Guatemala (Jutiapa and Retalhuleu), where it remains poorly known and collected. A collection from Belize was referred to the species by Daniel (1997a). Leonard (1941) provided an illustration of it in the protologue. Numerous collections from coastal western Mexico have been identified with this name; however, recent studies (Daniel 2009) reveal that the Mexican plants represent a distinct species, *D. novogaliciana* T.F. Daniel.

***Dicliptera membranacea* Leonard, J. Wash. Acad. Sci. 31:102. 1941.** TYPE.— GUATEMALA. **Escuintla**: between Río Jute and Río Pantaleón on road between Escuintla and Santa Lucía Cotz, 540–720 m, 24 Jan 1939, *P. Standley 63524* (holotype: US! isotype: F!).

Perennial herbs to 1 m tall. Young stems quadrate-sulcate to hexagonal, subglabrous to ± bifariously pubescent with flexuose to retrorse to retrorsely appressed eglandular trichomes 0.1–0.3 mm long, trichomes concentrated near nodes. Leaves petiolate, petioles to 56 mm long, blades ovate to ovate-elliptic, 37–115 mm long, 15–68 mm wide, 2.5–2.9 times longer than wide, acute to acuminate at apex, acute to subattenuate at base, surfaces subglabrous or with antrorse eglandular trichomes mostly restricted to major veins. Inflorescence of cymes of cymules in axils of distal leaves and/or leaflike bracts sometimes forming a ± dense and terminal compound inflorescence, inflorescence bracts (if present) sessile to short-petiolate, ovate to lance-ovate, 14–22 mm long, 4–6 mm wide, inflorescence rachis (if present) ± evenly pubescent with retrorse eglandular trichomes; cymes 1–4 per axil, alternate (i.e., in only 1 axil per node), subsessile to pedunculate, peduncles 0.5–3 (–5) mm long; paired bracts subtending cymes elliptic to obovate-elliptic, 7–16 mm long, 3.2–6 mm wide, acute to acuminate and sometimes subfalcate at apex, emucronate to submucronate, abaxial surface sparsely pubescent with antrorse eglandular trichomes 0.1–0.3 mm long, margin ciliate with erect to flexuose to antrorse eglandular trichomes 0.2-0.8 mm long; cymules 3–5 (–6) per cyme, sessile to subsessile, peduncles to 2 mm long. Outer cymule bracteoles often whitish, obovate, those of a pair equal to subequal in size, 7.5–13.5 mm long (the longer one 1–1.3 times longer than the shorter one), 2.2–5 mm wide, acute to rounded-apiculate and ± mucronate at apex, mucro to 0.2 mm long, abaxial surface sparsely pubescent with antrorse eglandular trichomes 0.05–0.3 mm long, adaxial surface pubescence including an understory of erect glandular trichomes to 0.05 mm long (glandular puberulent), margin ciliate with erect to flexuose trichomes to 1 mm long. Inner cymule bracteoles often whitish, linear to lanceolate, 4–10 mm long, 0.3–1.1 mm wide, abaxial surface pubescent like outer cymule bracteoles. Flowers sessile to subsessile (pedicels to 0.5 mm long). Calyx 5.2–7 mm long, lobes subulate, 4–5.8 mm long, abaxially pubescent like outer cymule bracteoles and also glandular puberulent. Corolla resupination unknown, purplish, 13–14 mm long, externally pubescent with flexuose to retrorse eglandular trichomes 0.2–0.5 mm long and glandular puberulent, tube 6.5 mm long, 1 mm in diameter near midpoint, lips 6–6.5 mm long. Stamens 7 mm long, filaments sparesly pubescent with eglandular trichomes, thecae with direction of dehiscence unknown, 0.8–0.9 mm long, ± equal in size, parallel to subperpendicular, unequally inserted to superposed (contiguous). Style 10 mm long, pubescent with eglandular trichomes (at least proximally), stigma lobes ± equal, 0.2 mm long. Capsule 5.2–6 mm long, pubescent with erect to flexuose eglandular trichomes 0.2–0.3 mm long and glandular puberulent. Seeds 2.5–2.6 mm long, 2.2–2.4 mm wide, surfaces and margin covered with trichome-like papillae bearing barbs.

PHENOLOGY.— Flowering: January–March; fruiting: January–March.

HABITATS.— Wet forests, wet thickets, along streams, slopes; 600–720 m.

Escuintla: *Standley 63524* (type, see above); same locale as type: *Standley 63515* (F, US); NE of Escuintla, barranco of Río Burrión, *Standley 89590* (F, US). **San Marcos**: Río Mopá, below Rodeo, *Standley 68775* (F, US).

This species is variable in its morphology based on the known specimens from Mexico and Guatemala that have been attributed to it. For this reason, and lacking a taxonomic treatment of the genus for Mexico and Central America, the description above is based solely on the type and other collections from Guatemala that resemble it as cited above. A collection from Alta Verapaz (between Santa Cruz and Tactic, 1375 m, 14 April 1941-frt, *Standley 92268* at F and US) was annotated by Gibson as *D. membranacea* in 1970. It generally resembles this species except that trichomes on the young stems are more generally disposed and 0.1-0.5 mm long, the rachis is evenly pubescent with flexuose eglandular trichomes to 0.5 mm long, the cymes are opposite at nodes, the outer cymule bracteoles are elliptic to strap-shaped, the calyx is 4–5 mm long, and the capsules (to 7 mm long) are pubescent with eglandular trichomes only. No corollas are evident on the specimens, and the taxonomic disposition of this collection must await further studies.

***Dicliptera sciadephora* Donn. Sm.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: December–February; fruiting: December–February.

HABITATS.— Moist evergreen forests, oak forests, moist to wet thickets, forest edges; 1350–2250 m.

Alta Verapaz: *von Tuerckheim II 2106* (US). **Chimaltenango**: *Johnston 1605* (F). **Huehuetenango:** *Nelson 3584* (holotype: US; isotoypes: GH, US). **Sacatepéquez**: *Daniel & Véliz 11208* (BIGU, BR, CAS, K, MICH, MO, US). **San Marcos:** *Steyermark 36861* (holotype of *D. vulcanica* Leonard: F; isotype: US).

Gibson (1974) noted the occurrence of *D. sciadephora* in Petén; all collections so identified by her from this department at F pertain to *D. sexangularis*.

***Dicliptera sexangularis* (L.) Juss.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: December–April; fruiting: December–May.

HABITATS.— Moist forests, secondary forests, tall forests, short forests, scrub forests, ramonales, moist thickets, forest edges, disturbed sites (e.g., roadsides); 50–1100 m.

LOCAL NAMES.— "Amor seco" (*Tejada 152*); "yerba fluxion" (*Cook & Martin 202*).

Alta Verapaz: *Standley 91772* (F, US). **Chiquimula**: *Molina R. & Molina 25397* (F). **El Progreso**: *Steyermark 43330* (F, US). **Huehuetenango**: *Castillo & Castillo 2729* (F). **Petén**: *Steyermark 46187* (F). **Retalhuleu**: *Standley 88314* (F, US). **Sololá**: *Artamanoff s.n.* (F). **Suchitepéquez**: *Kellerman 4977* (US). **Zacapa**: *Daniel et al. 11232* (BIGU, CAS, K, MICH, MO).

Gibson (1974) treated this species with the name *D. assurgens* (L.) Juss., a taxonomic synonym (see Daniel 1995b).

***Dicliptera thlaspioides* Nees**

RECENT DESCRIPTION.— Daniel (1999a).

PHENOLOGY.— Flowering: September–November; fruiting: September–November.

HABITAT.— Along streams; 900–980 m.

Huehuetenango: Cuilco, Aldea Canibal, Río Cuilco, 15°24'04.1"N, 92°03'35.1"W, *P. Velásquez & M. Véliz 441* (BIGU), *P. Velásquez et al. 442* (BIGU), *P. Velásquez et al. 476*

(BIGU); Mpio. Cuilco, Aldea Canibal, Transecto III, 15°24'17.1"N, 91°02'47.7"W, *M. Véliz et al. 17920* (BIGU).

This species is newly reported from Guatemala based on the four recent (2006–2007) collections noted above, all of which came from the same region in Huehuetenango. The species was previously known only from western and southern Mexico (Daniel 1999a, 2009), where it is sometimes locally abundant in tropical deciduous forests, oak forests, and disturbed sites.

Dicliptera unguiculata **Nees**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: November–March; fruiting: November–May.

HABITATS.— Oak forests, pine-oak forests, wet or dry thickets, brushy slopes, disturbed sites (e.g., eucalyptus forests, roadsides); 915–2100 m.

LOCAL NAMES.— "Hierba de cáncer" (*Standley 64745*); "lavanda" (*Immerzell & Pardo 109*); "panalitos" (*Aguilar 6*).

LOCAL USE.— Leaves are used to alleviate "mal de orina, gastritis y inflamación" (*Immerzell & Pardo 109*).

Alta Verapaz: *Tejada s.n.* X 1913 (USCG). **Chimaltenango**: *Standley 80801* (F, US). **Guatemala**: *Standley 59543* (F, US). **Jalapa**: *Standley 77449* (F). **Quezaltenango**: *Standley 67245* (F). **Sacatepéquez**: *Standley 60899* (F, US). **Sololá:** *Daniel & Barreno 11264* (BIGU, CAS).

Pollen of this species (based on *Daniel & Barreno 11264*) differs from other Mexican and Guatemalan species of *Dicliptera* by its deeper reticulum with more conspicuous collumelae (Fig. 5).

Dyschoriste capitata **(Oerst.) Kuntze**

RECENT DESCRIPTIONS.— Daniel (1995b, 1999a).

PHENOLOGY.— Flowering: June–September; fruiting: June–December.

HABITATS.— Mixed forests, pine forests, moist thickets, moist rocks along streams, disturbed sites (e.g., roadsides, pastures); 1500–2800 m.

LOCAL NAME.— "Lombricera" (*Molina R. & Molina 26537*).

Chimaltenango: *Skutch 474* (holotype of *D. skutchii* Leonard: US). **Huehuetenango**: *Steyermark 48202* (F, US). **Jalapa**: *Steyermark 33063* (F). **Quiché**: *Spuoss 138* (F).

Gibson (1974) treated this species with the name *D. skutchii*, a taxonomic synonym (see Daniel 1995b).

Daniel (2001) discussed the possible occurrence of *Dyschoriste hirsutissima* (Nees) Kuntze in Guatemala and provided descriptions of it (Daniel 1995b, 1999a; Daniel and Acosta C. 2003). It differs conspicuously from other species in the country by having glandular trichomes on various parts of the plant (e.g., stems, leaves, and/or calyx).

Dyschoriste ovata **(Cav.) Kuntze**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: July–October; fruiting: August–October.

HABITAT.— Pine forests; 1400–2000 m.

LOCAL NAMES.— "Clarencillo" (*Steyermark 50483*), "madre selva" (*Barrientos s.n.*).

Chimaltenango: *Johnston 30* (F). **Guatemala**: *Tonduz 824* (US). **Huehuetenango**: *Steyermark 50483* (F, US).

Gibson (1974) noted that Loesener had reported this species from the department of Quezaltenango; she also noted that some of Loesener's other identifications of *Dyschoriste* from

Guatemala were likely erroneous. No collections of *Dyschoriste* from Quezaltenango were located, but it is likely that the genus occurs there.

***Dyschoriste quadrangularis* (Oerst.) Kuntze**

Recent descriptions.— Daniel (1995b), Daniel and Acosta C. (2003).

Phenology.— Flowering: October–January; fruiting: October–February.

Habitats.— Moist oak forests, dry pine-oak forests, marshes, moist thickets, open slopes, brushy slopes; 850–1550 m.

Local names.— "Tucuquita" (*Molina R. & Molina 27687*); "tucuquita de agua" (*Standley 75275*).

Chimaltenango: *Standley 64358* (F). **Guatemala**: *Aguilar 282* (F). **Jalapa**: *Standley 77146* (F, US). **Jutiapa**: *Standley 75998* (F, US). **Sacatepéquez**: *Standley 63348* (F, US). **Santa Rosa**: *Standley 60453* (F).

***Elytraria bromoides* Oersted**

Recent descriptions.— Daniel (1995b), Daniel and Acosta C. (2003).

Phenology.— Flowering: April–June; fruiting: April.

Habitat.— Unknown; 360 m.

Alta Verapaz: *von Tuerckheim 3586* (US). **Petén**: *Lundell 3708* (CAS, F, GH, MICH).

Elytraria bromoides is uncommon in Guatemala. It sometimes becomes locally abundant northward and westward toward the northern extent of its range in Texas. Outside of Guatemala, it occurs in diverse communities (often at disturbed sites), including arid scrub, tropical deciduous forests, oak forests, pine forests, and evergreen seasonal forests. It differs from the more common *E. imbricata* by its stemless habit, larger and pinkish (vs. blue) corollas (Fig. 2L, M), and entire (vs. apically 3-lobed) bracts.

***Elytraria imbricata* (Vahl) Pers.**

Recent descriptions.— Daniel (1995b, 1997b, 1999a), Daniel and Acosta C. (2003).

Phenology.— Flowering: October–May; fruiting: October–May.

Habitats.— Tropical deciduous forests, low forests, ramonales, dry to moist thickets, brushy slopes, pastures, disturbed sites (e.g., roadsides, agricultural lands); 5–3000 m.

Local names.— "Cola mayci" (*Steyermark 29039*); "flor de mosquito" (*Standley 75545*); "hierba del cancer" (*Alvarez 24*).

Baja Verapaz: *Johnston 1162 (F)*. **Chiquimula**: *Molina R. & Molina 25381* (F). **El Progreso**: *Véliz & Ramirez 12782* (BIGU). **Escuintla**: *Standley 64161* (F). **Guatemala**: *Tejada 145* (US). **Huehuetenango**: *Standley 811425* (F). **Jutiapa**: *Standley 75545* (F). **Petén**: *Contreras 5619* (F, GH, MO). **Quetzaltenango**: *Rodríguez 98* (U). **Quiché**: *Véliz et al. 17776* (BIGU). **Retalhuleu**: *Kellerman 6663* (F, US). **Sacatepéquez**: *Standley 64964* (F). **San Marcos**: *Daniel et al. 11321* (BIGU, CAS, K, MO). **Santa Rosa**: *Standley 77826* (F). **Sololá**: *Pöll 13539* (UVAL). **Suchitepéquez**: *Standley 60253* (F). **Zacapa**: *Steyermark 29039* (F). **Department unknown**: Pacific lowlands, Finca Fielauer, *Brenckle 47–218* (UC).

Bracts of Guatemalan plants all show a ± prominent 3-parted apex, which is generally diagnostic for the species, except in immature inflorescences. Gibson (1974) reported this species from Alta Verapaz and Chimaltenango, but no collections from those departments were located.

Henrya insularis **Nees ex Benth.**

RECENT DESCRIPTIONS.— Daniel (1990a, 1995b, 1997b, 1999a), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: January–April; fruiting: February–April.

HABITATS.— Tropical deciduous forest-oak forest transitions, tropical subdeciduous forests, dry thickets, dry and brushy slopes and plains, along streams; 120–1300 m.

LOCAL NAME.— "Tiramachete" (*Morales R. 911*).

Chimaltenango: *Johnston 1160* (F). **El Progreso:** *Daniel et al. 11211* (BIGU, CAS, K, MICH, MO). **Guatemala:** *Donnell Smith 1923* (holotype of *H. imbricans* Donn. Sm.: US; isotype: GH); *Morales R. 911* (holotype of *H. puberula* Happ: F; isotypes: AGUAT, US). **Huehuetenango**: *Véliz et al. 11203* (BIGU). **Retalhuleu**: *Standley 88432* (F, US). **Santa Rosa**: *Heyde & Lux 4559* (holotype of *H. donnell-smithii* Happ: MO; isotypes: GH, US). **Sololá**: *Artamanoff s.n.* (F). **Zacapa**: *Deam 397* (holotype of *Tetramemrium gualanense* Robins. & Bartl.: GH; isotype: MICH).

Gibson (1974) recognized *Henrya gualanensis*, *H. imbricans*, *H. puberula*, and *H. scorpioides* Nees. The type of the latter name pertains to *Dicliptera sexangularis* (see Daniel 1990a:130); the other three species were treated as conspecific with *H. insularis* by Daniel (1990a).

Hygrophila costata **Nees**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: September–May; fruiting: September–May.

HABITATS.— Wet thickets, marshes, along streams, ditches, depressions; 150–1400 m.

Alta Verapaz: *Standley 70984* (F, US). **Chiquimula**: *Molina R. & Molina 25255* (F). **Escuintla**: *Standley 63454* (F, US). **Izabal**: *Standley 23803* (US). **Quezaltenango**: *Skutch 2032* (US). **Quiché**: *Aguilar 1501* (F). **Retalhuleu**: *Steyermark 34533* (F). **San Marcos**: *Standley 68877* (F). **Suchitepéquez**: *Standley 67010* (F).

Gibson (1974) recognized both *H. costata* and *H. guianensis* Nees from Guatemala. These were treated as conspecific by Daniel (1995b).

Hypoestes phyllostachya **Baker**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: November–February; fruiting: November–February.

HABITATS.— Disturbed sites; 1000–1500 m.

Alta Verapaz: *Daniel et al. 11362* (CAS). **Baja Verapaz**: *Daniel & Véliz 11331* (BIGU, CAS). **Escuintla:** *Vizcaíno 6156* (UVAL). **Guatemala**: *J. Castillo & L. Cruz 2325* (F). **Sacatepéquez:** *Véliz 12651* (BIGU). **San Marcos**: *R. Barillas s.n.* (BIGU, MO).

This commonly cultivated and often escaping species was not noted to occur in Guatemala by Gibson (1974). It is endemic to Madagascar. The collections noted above represent (e.g., *Daniel & Véliz 11331*, *Daniel et al. 11362*) or appear to represent (other collections noted) naturalized occurrences. Occurrences in other departments were noted to be from cultivated plants.

Justicia albobractea **Leonard**

RECENT DESCRIPTION.— Daniel (1993b).

PHENOLOGY.— Flowering: November–February; fruiting: February–March.

HABITATS.— Tropical moist forests, tall forests, along streams; ca. 300–700 m.

Petén: *Contreras 9356* (F, LL, MO, US).

The species is known from at least six collections from Petén and Belize. It was not treated from Guatemala by Gibson (1974), but was noted to occur in the country by Daniel (1993b). *Steyermark 41998* (F, US) from Izabal is a barely fertile, fruiting collection that might also pertain to this species. *Justicia albobractea* is superficially similar to the Costa Rican *J. sarapiquensis* McDade, which differs by its climbing habit (vs. shrub), ovate (vs. narrowly eliptic to narrowly obovate-elliptic) and glabrous (vs. pubescent) leaf blades, terminal panicles (vs. axillary spikes), magenta (vs. greenish white) bracts that are 14–16 (vs. 4.5–9.5) mm wide, calyx lobes 15–22 (vs. 4.5–5.5) mm long, corollas 65–70 (vs. 29–31) mm long, anther thecae 4 (vs. 1.6–2) mm long, glabrous (vs. pubescent near apex) capsules 15–20 (vs. 9.5–10.5) mm long, and glabrous (vs. pubescent) seeds 3–4 (vs. 1.8–2.4) mm in diameter.

***Justicia aurea* Schlecht.**

RECENT DESCRIPTIONS.— Daniel (1995b), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: August–April; fruiting: December–February.

HABITATS.— Moist to wet forests, forest remnants with *Chiranthrodendron*, cloud forests of mixed hardwoods, tall forests, dry forests, moist thickets, along streams, swampy depressions, disturbed sites (e.g., hedgerows); (245-) 950–2500 m.

LOCAL NAMES.— "Plumero" (*Standley 64743*); "pompóm" (*Standley 64743*).

Alta Verapaz: *von Tuerckheim II–200A* (F, MO, US). **Chimaltenango**: *Standley 60051* (F). **Chiquimula**: *Steyermark 31700* (F). **Escuintla**: *Standley 64594* (F). **Guatemala**: *Donnell-Smith 1877* (US). **Huehuetenango**: *Véliz & Velásquez 19362* (BIGU). **Izabal**: *Kellerman 6684* (F). **Petén**: *Tún Ortíz 2057* (DUKE, F, MO, US). **Quezaltenango:** *Hartweg 552* (holotype of *Justicia umbrosa* Benth.: K; isotypes: BM, K). **Quiché**: *Skutch 1852* (US). **Retalhuleu**: *Shannon 160* (US). **Sacatepéquez**: *Standley 88982* (F). **San Marcos**: *Williams et al. 26034* (F). **Santa Rosa**: *Steyermark 33146* (F). **Sololá**: *Kellerman 5827* (US). **Suchitepéquez**: *Skutch 1581* (F, US).

The type of the taxonomic synonym *Justicia velasquezii* Bertol. (as "vellasquezii;" *Velásquez s.n.* at BOLO, image!) was collected from an unknown locale in Guatemala.

This showy species is cultivated for ornament in some Guatemalan gardens. The large and abundant flowers are yellow and turn golden or orangish in age. They are sometimes noted to be visited by hummingbirds (e.g., *Nee et al. 47220*, MO). A red-flowered form of this species was described as *J. aurea* forma *erythrantha* (Standl. & Steyerm.) D.N. Gibson (based on *Jacobinia umbrosa* forma *erythrantha* Standl. & Steyerm.). Gibson (1974) incorrectly listed this taxon as forma "erythrina." Standley and Steyermark (1947) noted that the form, known only from the type (*Standley 60082*: holotype at F! isotype at US!) and a paratype (*Johnston 1108* at F!), both from Volcán de Acatenango, above Las Calderas in Chimaltenango, appears to differ from typical plants of the species only by its red corollas. Based these two collections, this indeed appears to be the case. Gibson (1974) referred *Laughlin 2565* from Chiapas to this taxon, but Daniel (1995b) indicated that this Mexican collection pertains to *J. soliana*.

***Justicia bartlettii* (Leonard) D.N. Gibson**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: December–April; fruiting: January–April.

HABITATS.— Lowland rain forests, tall forests, short forests, ramonales, zapotales, streamsides; 10–165 m.

Alta Verapaz: *Steyermark 45571* (F, MICH, US). **Izabal**: *Daniel et al. 11240* (BIGU, CAS, MO). **Petén:** *Tún Ortíz 1529* (holotype of *J. pilifera* D.N. Gibson: F; isotype: MO).

Gibson (1974) recognized *J. pilifera* as distinct from *J. bartlettii*. Daniel (1995b) treated them as conspecific. *Justicia eburnea* is superficially similar but generally glabrous (see distinctions under *J. eburnea* below).

***Justicia* borrerae (Hemsl.) T.F. Daniel**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: March–November; fruiting: March, July.

Habitats.— Montane forests, thickets; 1200–2000 m.

Local names.— "Jasmín de montaña" (*White 5450*); "palma de monte" (*Steyermark 37219*).

Huehuetenango: *Sánchez 1678* (USCG). **San Marcos**: *Steyermark 37219* (F).

Gibson (1974) treated this species as *Neohallia borrerae* Hemsl. Daniel (1995a) treated *Neohallia* as congeneric with *Justicia*. Photos of this species at USCG reveal it to have orange corollas (with the lower lip ± coiled) and subtending bracts that are greenish with a reddish tinge. The species has been collected recently (e.g., 2009) on the lower slopes of Volcán Tajumulco in San Marcos (e.g., *Morales 564* at F and *Sirin 29* at BIGU). Information on *Morales 564* notes that plants were small trees to 10 m tall.

***Justicia breviflora* (Nees) Rusby**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: January–September; fruiting: January–September.

Habitats.— Lowland rain forests, tall forests, mixed forests, moist to wet thickets, along streams, acahuales, ramonales, disturbed sites (e.g., agricultural lands, clearings); 0–1500 m.

Alta Verapaz: *Standley 90003* (F). **Baja Verapaz**: *Pittier 153* (US). **Chimaltenango**: *Johnston 1904* (F). **Huehuetenango**: *Steyermark 49388* (F, US). **Izabal:** *Blake 7800* (holotype of *Dianthera riparia* S.F. Blake: US). **Petén**: *Contreras 9754* (F, US). **San Marcos**: *Steyermark 37588* (F).

The type of *Pseuderanthemum tetrasepalum* (S.F. Blake) S.F. Blake, which was treated by Gibson (1974) from Guatemala, pertains to *J. breviflora* (Daniel 1997a). Gibson (1974) noted the variation in both color and size of the corollas encountered among Guatemalan plants of this species. *Daniel & Véliz 11259* from along a stream in Izabal, which accords well with the type of *D. riparia*, has white corollas suffused with patches and tinges of pink-purple and a pink-purple herringbone pattern on the proximal portion of the lower-central corolla lobe.

***Justicia campechiana* Standl.**

Recent descriptions.— Daniel (1995b, 2007).

Phenology.— Flowering: January, April; fruiting: January, April.

Habitats.— Tall forests, zapotales, ramonales; ca. 180–240 m.

Alta Verapaz: *Steyermark 45600* (F, MICH, MO, UC, US). **Petén**: *Contreras 5430* (DUKE, F, MO, US).

Steyermark 45600 from Alta Verapaz resembles plants from Chiapas by having the young stems evenly pubescent and the leaves, bracts, and calyx conspicuously pubescent. These plants were treated as subspecies *vestita* by Daniel (2007). Plants from the Petén of Guatemala, Belize, and the Yucátan Peninsula of Mexico have stems bifariously pubescent and the leaves, bracts, and calyx glabrous. The latter plants pertain to the nominate subspecies. In Guatemala subspecies *campechiana* occurs in evergreen seasonal forests at elevations to 240 m whereas subspecies *vestita* occurs in montane rain forests at elevations above 500 m.

***Justicia candelariae* (Oerst.) Leonard**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: December–April; fruiting: February.

Habitats.— Moist to wet forests, montane forests, pine forests, moist to wet thickets, along streams; 250–1800 m.

Alta Verapaz: *von Tuerckheim 8726* (holotype of *J. tuerckheimiana* Donn. Sm.: US). **Quezaltenango**: *Skutch 2009* (F, US). **San Marcos**: *Standley 68945* (F, US). **Suchitepéquez**: *Standley 66861* (F).

Gibson (1974) tentatively recognized both *J. chiapensis* Brandegee and *J. tuerckheimiana*; these were treated as conspecific with *J. candelariae* by Daniel (1995b). She also noted the occurrence of the species from El Progreso. No specimens from that department were located during this study.

Justicia carthagenensis **Jacq.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: August–March; fruiting: October–March.

HABITATS.— Oak woodland-pasture, moist to wet thickets, brushy slopes, in and along streams, disturbed sites (e.g., eucalyptus forests, hedges, roadsides, agricultural lands); 215–2200 m.

LOCAL NAMES.— "Capote azul" (*Morales R. 1092*); "hierba de tinta" (*Aguilar 27*); "sacatinta" (*Molina R. & Molina 27690*); "tinta cimarrona" (*Standley 88764*); "tinta silvestre" (*Morales R. 766*); "yerba de tinta" (*Steyermark 52161*).

Chimaltenango: *Seler & Seler 2288* (POM, US). **Chiquimula**: *Steyermark 30317* (F). **Escuintla**: *Aguilar 1687* (F). **Guatemala**: *Molina R. & Molina 27690* (F). **Jutiapa:** *Standley 75969* (holotype of *J. corynimorpha* D.N. Gibson: F; isotype: US). **Petén**: *Contreras 3481* (F, LL, MO, US). **Retalhuleu**: *Molina R. & Molina 27113* (F, MICH). **Sacatepéquez**: *Standley 63233* (F, US). **Santa Rosa**: *Standley 79531* (F, US). **Sololá**: *Molina R. 15276* (F). **Suchitepéquez**: *Standley 62101* (F, US). **Zacapa**: *Steyermark 42104* (F).

Gibson (1974) recognized *J. corynimorpha* as distinct from *J. carthagenensis*. Daniel (1995b) treated them as conspecific. Gibson (1974) noted the occurrence of the species in Baja Verapaz. No collections from that department were located during this study. The identity of some collections identified as this species (e.g., *Molina R. & A. Molina 26656* at MICH from Sololá) differ from others by their glabrous internodes, dense terminal headlike inflorescences to 5 cm in diameter, and exceptionally large (2.5–4.5 mm wide) and apically subcaudate calyx lobes. Until variation in this species from throughout its range is better documented, these collections are tentatively treated as *J. carthagenensis*.

Justicia caudata **A. Gray**

RECENT DESCRIPTIONS.— Daniel (1995b), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: September–November; fruiting: October–January.

HABITAT.— Tropical deciduous forests, moist and brushy slopes, potreros, disturbed sites (e.g., roadsides); 300–575 m.

LOCAL NAME.— "Monteritas" (*Morales R. 1347*).

El Progreso: *Cóbar & Véliz 1057* (BIGU, MO). **Jalapa**: *Morales R. 1347* (F). **Zacapa**: *Standley 73995* (F, US).

Gibson (1974) noted the occurrence of this species in Retalhuleu. No collections from that department were located during this study.

Justicia ciriloi **T.F. Daniel**

RECENT DESCRIPTION.— Daniel (2005).

PHENOLOGY.— Flowering: November; fruiting: November.

HABITAT.— Moist and shady slopes along streams; "600–1800" m.

Chiquimula: *Steyermark 31740* (holotype of *Beloperone blechioides* Leonard: F).

This species is known in Guatemala only from the type collection made in 1939 and is either rare or extirpated in the country. It has been collected at least three times more recently in Honduras (Daniel 2005). Daniel (2005) discussed the taxonomic history of *J. ciriloi*. Gibson (1974) included this taxon (as *B. blechioides*) and *J. brandegeana* Wassh. & L.B. Sm. within a broad concept of *J. fulvicoma* Schlecht. *Justicia brandegeana* is cultivated in Guatemala, and *J. fulvicoma* might be as well. The illustration provided by Gibson (1974), labeled as *J. fulvicoma*, pertains to *J. ciriloi*. These three species can be distinguished by the following key:

1. Corolla white to yellowish with reddish or maroon spots on lips; mature seeds minutely granulate (appearing ± smooth).
    2. Inflorescence erect; bracteoles linear-elliptic to elliptic, 1.4–3 mm wide . . . . *J. ciriloi*
    2. Inflorescence drooping or nodding; bracteoles ovate to elliptic, 3–6.5 mm wide . . . . *J. brandegeana*
1. Corolla orange with reddish spots on lips; mature seeds minutely granulate and also tuberculate with low, rounded to subconic mounds that are sometimes ± coalesced into chains or ridges . . . . *J. fulvicoma*

Justicia clinopodium Gray ex Greenm.

Recent Description.— Daniel (1995b).

Phenology.— Flowering: July–September; fruiting: August–September.

Habitat.— Moist thickets; 1350–2000 m.

Local name.— "Tucuquita" (*Molina R. & Molina 26318*).

Huehuetenango: *Steyermark 51782* (F, US).

Although rarely collected in Guatemala, this species is considerably more widespread and abundant in Mexico where it occurs in pine-oak forests at elevations from 1410 to 2400 meters.

Justicia colorifera V.A.W. Graham

Recent Description.— Daniel (1995b).

Phenology.— Flowering: November–May; fruiting: unknown.

Habitats.— Tropical dry forests, along streams; 350–1300 m.

Local names.— "Jiquilite" (*Castillo & Castillo 2807*, *Sálas 663*); "saca tinta" (*Castillo & Castillo 2807*); "tinta" (*McCarry 152*; *Steyermark 33706*).

Local Uses.— Leaves used to bleach clothes and to cure "evil eye" (*McCarry 152*); used medicinally to treat urinary infections and diarrhea (*Castillo & Castillo 2807*); yields a blue dye (*Cook & Griggs 147*).

Alta Verapaz: *von Tuerckheim 8544* (US). **El Progreso**: *Fortuny s.n.* 25 XI 2005 (USCG). **Guatemala**: *Tejada s.n.* IV 1913 (USCG). **Huehuetenango**: *Castillo & Castillo 2807* (F). **Quezaltenango**: *Steyermark 33706* (F). **Sacatepéquez**: *McCarry 152* (TEX). **Santa Rosa**: *Heyde & Lux 4557* (F, MO, US).

This species was treated by Gibson (1974) under the name *J. tinctoria* (Hemsl.) D.N. Gibson, an illegitimate nomenclatural synonym (see Daniel 1995b). The species has been cultivated in parts of Mexico and Central America for the uses noted above. Although they were not noted to be so, some of the collections cited above likely represent cultivated plants. *Standley 69470* from Alta Verapaz (near Cobán, 1260–1440 m, 26 Mar–15 Apr 1939 at F) was noted to be common in gardens and hedges. It was also noted to have the local name, "jiquelite." It differs from most representatives of *J. colorifera* by having the young stems, peduncles, and rachises pubescent with flexuose to retrorse eglandular trichomes to 2 mm long rather than glabrous; its corollas were noted to be pale red. This collection, together with a similar one from Baja Verapaz (Unión Barrios, W of KM 156 on the Cobán Road, tall forest on hill, 11 Apr 1975, *Lundell & Contreras 19164* at F, LL, and MO) that has similar pubescence and pink corollas, might comprise another (possibly undescribed) taxon. Neither of these collections is included here under *J. colorifera*.

***Justicia comata* (L.) Lam.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: September, December–May; fruiting: September–May.

HABITATS.— Moist forests, perennial forests subject to flooding, swamps, marshes, short forests, moist to wet thickets, clearings, along streams, disturbed sites (e.g., roadside ditches); 0–300 m.

Alta Verapaz: *von Tuerckheim 7653* (US). **Escuintla**: *Standley 64005* (US). **Izabal**: *Steyermark 39764* (F). **Petén**: *Molina R. 15634* (F). **San Marcos**: *Steyermark 38022* (F). **Santa Rosa**: *Standley 79578* (F, US).

Gibson (1974) reported the occurrence of this species in Retalhuleu. No specimens from that department were located during this study.

***Justicia eburnea* D.N. Gibson**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: March–May, August; fruiting: March–May, August.

HABITATS.— Tall forests, short forests, zapotales; 0–210 m.

Alta Verapaz: *Steyermark 45023* (F). **Izabal:** *Steyermark 39535* (holotype: F). **Petén**: *Steyermark 46109* (F, MICH, US).

Daniel's (1995b) key to and description of *J. eburnea* incorrectly indicates that it has five calyx lobes when, in fact, it has only four. The species can be distinguished from the superficially similar *J. bartlettii* by the following couplet:

Young stems, leaf surfaces, peduncles, and rachises glabrous; bracts triangular to subulate, 0.5–1.5 mm long, abaxially glabrous; bracteoles triangular, 0.5–1.3 mm long, abaxially glabrous; calyx 2.5–3.5 mm long, abaxially glabrous; corolla externally glabrous . . . . *J. eburnea*

Young stems, leaf surfaces, peduncles, and rachises pubescent; bracts lance-subulate to lanceolate, 2–5 mm long, abaxially pubescent; bracteoles lance-subulate to lanceolate, 2–5 mm long, abaxially pubescent; calyx 6–12 mm long, abaxially pubescent; corolla externally pubescent . . . . *J. bartlettii*

***Justicia fimbriata* (Nees) V.A.W. Graham**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: December–July; fruiting: December–April.

HABITATS.— Lowland rain forests, lowland moist evergreen forests, moist montane forests, tall forests, short forests, rocky hills, zapotales, disturbed sites (e.g., clearings); 0–1280 m.

Huehuetenango: *Holdridge 2332* (US). **Izabal**: *Daniel et al. 11235* (BIGU, CAS, K, MICH, MO). **Petén**: *Contreras 6622* (F, LL, MO, US). **Quiché**: *Morales & Pérez 4600* (USCG). **San Marcos**: *Steyermark 37548* (F).

Gibson (1974) treated this species with the name *J. magniflora* (Blake) D.N. Gibson, a taxonomic synonym (Daniel 1995b). She also noted its occurrence in Baja Verapaz (possibly based on *Watson 73* from "eastern portions of Vera Paz and Chiquimula").

Justicia gibsoniae **S.S.R. Bennet & S. Chandra, J. Econ. Taxon. Bot. 3(2):602. 1982**, as "gibsonia." *Justicia grandifolia* D.N. Gibson, Fieldiana: Bot. 34:69. 1973, non T. Anders. (1867). **Type.**— GUATEMALA. **Izabal**: Cerro San Gil, 300–900 m, 25 Dec 1941, *J. Steyermark 42001* (holotype: F!; isotype: US!).

Monocaulous shrubs to 1.5 m tall. Young stems subquadrate-ridged, glabrous to ± scurfy. Leaves (upper) subsessile, petioles to 6 mm long, blades elliptic to obovate-elliptic, 245–330 mm long, 80–95 mm wide, 3.1–3.8 times longer than wide, acute to subacuminate at apex, attenuate at base, abaxial surface glabrous. Inflorescence of terminal panicles (of spikes) to 280 mm long (including peduncle and excluding flowers), peduncles to 60 mm long, peduncle and main rachis sparsely pubescent with retrorse to flexuose eglandular trichomes 0.1–0.2 mm long in 1 or more lines; inflorescence bracts (subtending dichasiate spikes) to 35 mm long, oblanceolate, 7–9.5 mm long, 1.5–2 mm wide; dichasia sessile, alternate along spikes, 1-flowered. Bracts apparently homomorphic (i.e., sterile bracts similar to fertile bracts), linear, 10 mm long, 1.6 mm wide, abaxial surface glabrous, margin with sparse flexuose eglandular trichomes to 0.6 mm long. Bracteoles lanceolate, 7.5 mm long, 1 mm wide, abaxial surface glabrous, margin pubescent like bracts. Calyx 5-lobed, 9.5 mm long, lobes lanceolate, 8.5 mm long, abaxial surface glabrous, margin pubescent like bracts. Corolla "pale yellow with greenish tip," 40–54 mm long, externally pubescent with erect to flexuose glandular and eglandular trichomes trichomes 0.05–0.8 mm long, tube 25–32 mm long, gradually expanded distally, not differentiated into narrow proximal portion and throat, 2.5–3 mm in diameter near midpoint, upper lip 15–22 mm long, 2-fid, lower lip sometimes ± recoiled, 15–20 mm long, 3-lobed, lobes 2.5 mm long, 1 mm wide. Stamens 9–11 mm long, filaments glabrous, thecae 2.5–3 mm long, subequal to equal in length, unequally inserted (overlapping by 0.2 mm) to superposed (contiguous), ± parallel, both with a basal appendage 0.2–0.7 mm long (appendages larger on lower thecae), at least distal theca dorsally pubescent with a few trichomes (possibly glandular?); pollen (fide Gibson 1972) 3-aperturate, apertures flanked on each side by 1 row of insulae. Style not seen. Capsules not seen.

Phenology.— Flowering: December; fruiting: unknown.

Habitat.— Moist and forested slopes; 300–900 m.

Izabal: *Steyermark 42001* (type, see above).

Because Gibson's name for this species was a later homonym, Bennet and Chandra (1982) proposed another one for it.

Justicia gibsoniae is endemic to Guatemala (Izabal), and remains known only from the type collection. Although the exact locality of collection on Cerro San Gil is not known, it presumably lies within one of the protected regions that encompass most of that montane system. The conservation status of this species remains unknown, but it might be regarded as possibly extirpated until plants of it are relocated.

Justicia inaequalis **Benth.**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: October–March; fruiting: January–March.

Habitats.— Wet montane forests, cloud forests, moist evergreen forests, mixed forests, dry secondary forests, moist thickets, moist forested ravines, along streams; 450–2400 m.

Alta Verapaz: *Véliz et al. 20002* (BIGU). **Chimaltenango**: *Standley 61994* (F, US). **Escuintla**: *Standley 61296* (F, US). **Guatemala**: *Aguilar 603* (F). **Huehuetenango**: *Velásquez s.n.* 17-XII-2008 (BIGU). **Quezaltenango:** *Hartweg 553* (holotype: K; isotypes: BM, G, K, P). **Retalhuleu**: *Shannon 258* (US). **Sacatepéquez**: *Daniel & Véliz 11210* (BIGU, CAS, K, MO). **San Marcos**: *Steyermark 37335* (F). **Sololá**: *Quedensley 4874* (BIGU).

Collections from Petén and Izabal that have been identified with this name are treated as a distinct species, *J. velizii* (see below).

Justicia kanal **T.F. Daniel**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: March–May; fruiting: unknown.

HABITATS.— Tall forests, zapotales; 300 m.

Izabal: *Contreras 11182* (F, LL, MO, US). **Petén:** *Lundell 2189* (holotype of *Beloperone aurea* Leonard: US; isotypes: LL, MICH).

Gibson (1974) treated this species under the name *J. flava* D.N. Gibson, an illegitimate nomenclatural synonym (Daniel 1995b).

Justicia lindeniana **(Nees) Macbride**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: May, December; fruiting: May, December.

HABITAT.— In and along streams; 75 m.

Izabal: *Muenscher 12581* (F).

Although rarely collected in Guatemala, this species is more abundant in southern Mexico where it occurs along streams in lowland rain forests and montane rain forests at elevations from 130 to 1700 meters.

Justicia macrantha **Benth.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: May–June; fruiting: unknown.

HABITAT.— Unknown; 1900 m.

LOCAL NAME.— "Cuajatinta" (*Tejada 8*).

Guatemala: *Tejada 8* (US). **Quezaltenango:** *Hartweg 551* (holotype: K; isotypes: BM, K, P).

This species is known only from a few collections in Guatemala. Gibson (1974) reported it from Alta Verapaz, but no collections from that department were located during this study. It was collected recently in Quezaltenango (*E. Tribouillier s.n.* in 2007 at BIGU). In Chiapas, it occurs in regions of cloud forest.

Justicia micrantha **(Oerst.) V.A.W. Graham, Kew Bull. 43:603. 1988, non Wall. (1830), nom. nud. nec Pohl ex Nees (1847), in syn. *Chaetothylopsis micrantha* Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1854:163. 1855**. *Chaetothylax micranthus* (Oerst.) Benth. & Hook.f. ex Hemsl., Biol. Centr.-Amer., Bot. 2:515. 1882. TYPE.— Nicaragua. **Segovia**: without locality, savanna, Jan, *A. Oersted 10635* (holotype: C!; isotype: K!).

Chaetothylax rothschuhii Lindau, Bull. Herb. Boissier 3:492. 1895. *Justicia rothschuhii* (Lindau) Durkee, Novon 9:510. 1999. TYPE.— Nicaragua. **Matagalpa**: river bank near Mazmaz, 200 m, 22 Mar 1894, *Rothschuh 410* (holotype: B, destroyed); Nicaragua. **Chontales**: ca. 2.8 km N of Cuapa, disturbed evergreen forest on hillside, 12°17'N, 85°23'W, 400–500 m, 21 Jan 1978, *W. Stevens 6143* (neotype, designated by Durkee in 1999: MO!).

Chaetothylax leucanthus Leonard, Contr. U.S. Natl. Herb. 31:663. 1958. TYPE.— Colombia. **Bolívar**: edge of thicket in Buenavista, E of Sincé, 100–200 m, 24 Jan 1918, *F. Pennell 3985* (holotype: NY; isotype: GH).

Decumbent to erect perennial herbs to 1 m tall. Young stems ± bifariously pubescent with flexuose to retrorse eglandular trichomes 0.3–1 mm long. Leaves petiolate, petioles to 25 mm long, blades ovate to elliptic, 30–110 mm long, 12–40 mm wide, 2.1–3.5 times longer than wide, acute to acuminate at apex, attenuate at base, surfaces subcoriaceous, pubescent (sometimes very sparsely so) with eglandular trichomes, margin often ± revolute. Inflorescence of axillary dichasiate spikes or panicles of spikes, these often in clusters and crowded near shoot apex forming a dense, sometimes fan-shaped, terminal compound inflorescence; spikes or panicles of spikes 1–2 (or more) per axil, spikes unilateral, rachis sparsely pubescent with erect to flexuose eglandular and glandular trichomes 0.05–0.1 mm long; dichasia alternate (i.e., 1 per spike node), sessile, 1-flowered. Bracts opposite, subulate, 5–9 mm long, 0.2–0.4 mm wide, abaxial surface pubescent like rachis and sometimes with antrorse eglandular trichomes to 0.5 mm long as well, margin ciliate with erect to flexuose to antrorse eglandular trichomes to 1 mm long. Bracteoles subulate, 6–9.5 mm long, 0.2 mm wide, pubescent like bracts. Calyx 4-lobed, 9–13.5 mm long, lobes subulate, 8.7–13 mm long, equal to subequal, pubescent like bracts except glandular trichomes usually more conspicuous. Corolla white, 9.5–16 mm long, externally pubescent with flexuose eglandular trichomes 0.1–0.3 mm long, tube ± cylindric (expanded only at apex, if at all), 7.5–14 mm long, 0.6–0.8 mm in diameter near midpoint, throat not evident or inconspicuous, upper lip 2–3.5 mm long, emarginate to 2-lobed, lobes to 0.4 mm long, lower lip 2–3.5 mm long, lobes 1.5–2.7 mm long, 1–1.6 mm wide. Stamens 3 mm long, inserted near apex of corolla tube, exserted from mouth, filaments glabrous, thecae 0.4–1 mm long, subparallel to subperpendicular, subequal to unequal in size (upper larger), lower theca sometimes abortive and appearing as a sterile appendage to 0.2 mm long, unequally inserted (overlapping by 0.2–0.3 mm) to superposed (contiguous or with a gap to 0.5 mm long), glabrous, lower theca with a basal appendage 0.05–0.1 mm long; pollen 2-aperturate, apertures flanked on each side by 2 rows of insulae. Style 9–13 mm long, proximally sparsely pubescent with eglandular trichomes, distally glabrous, stigma to 0.2 mm long, lobes not evident. Capsule 4.9–7 mm long, pubescent with erect to flexuose to retrorse glandular (sometimes very sparse, inconspicuous, or apparently absent) and eglandular trichomes 0.1–0.2 mm long, stipe 1.5–2.7 mm long, head with slight medial constriction, 3–4.4 mm long. Seeds 4, leticular, 1–1.5 mm long, 0.9–1.3 mm wide, surface and margin covered with trichomelike papillae bearing apical barbs.

PHENOLOGY.— Flowering: March; fruiting: March.

HABITATS.— Lake shores, dry thickets; 250–300 m.

Escuintla: *Standley 89140* (US). **Petén**: *Lundell 18307* (F, LL, MO, US).

Guatemalan plants of *Justicia micrantha* were treated by Gibson (1974) as *Chaetothylax rothschuhii* Lindau. Daniel (2005) noted the distribution of and names applied to this species. The description above pertains to plants from Guatemala, Honduras, and Nicaragua.

***Justicia multicaulis* Donn. Sm.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: December–February, June, October; fruiting: December–February.

HABITATS.— Montane forests, cloud forests, moist forests, second growth, along streams; 1210–1600 m.

Alta Verapaz: *von Tuerckheim 741* (lectotype: US; isolectotypes: MICH, US). **Baja Verapaz:** *Lundell & Contreras 21157* (F, LL, MO, US). **Huehuetenango:** *Steyermark 48884* (holotype of *J. alsophila* Standl. & Leonard: US; isotypes: F, MICH).

Gibson (1974) did not treat *J. alsophila*, but indicated that it resembled *J. multicaulis*. Daniel (1995b) treated them as conspecific. Corollas were described by Gibson (1974) as white with the upper lip purplish and by Daniel (1995b) as white with maroon-purplish markings on the lips. Corollas observed during these studies were light pink and with maroon and white markings on the lower lip.

This species is endemic to Chiapas and Guatemala. It was collected most recently from the Sierra de Chamá in Alta Verapaz (*Daniel et al. 11358* at BIGU, CAS, K, MO), where more than 50 plants were noted along a trail of ca. 100 m in a cloud forest remnant. The species was not observed in disturbed regions outside of the forest.

Justicia neomontana **S.S.R. Bennet & S. Chandra, J. Econ. Taxon. Bot. 3(2):602. 1982.** *Beloperone montana* Standl. & Leonard in P.C. Standley and J.A. Steyermark, Publ. Field Mus. Nat. Hist., Bot. 23:237. 1947. *Justicia montana* (Standl. & Leonard) D.N. Gibson, Fieldiana: Bot. 34:70. 1972, non Roxb. (1805). TYPE.— GUATEMALA. **Izabal**: uppermost summit of Cerro San Gil, 1200–1300 m, 26–27 Dec 1941, *J. Steyermark 41939* (holotype: F!; isotype: US!).

Perennial herbs to 1.5 dm tall. Young stems quadrate-sulcate to ± flattened, 4-fariously pubescent with flexuose eglandular trichomes to 1.8 mm long. Leaves petiolate, petioles to 15 mm long, blades elliptic, 57–110 mm long, 36–64 mm wide, 1.4–2.1 times longer than wide, acute at base, acute at apex, surfaces pubescent with flexuose to antrorse eglandular trichomes. Inflorescence of terminal panicles (of spikes) to 130 mm long, main rachis pubescent like young stems, inflorescence bracts subtending lateral dichasiate spikes linear to narrowly elliptic, 6–8 mm long, 0.8–1 mm wide; spikes to 40 mm long; dichasia sessile, alternate, 1-flowered. Bracts alternate, heteromorphic; fertile bracts spatulate to obovate, 10–14 mm long, 2–4 mm wide, abaxially and marginally pubescent with flexuose eglandular trichomes to 2 mm long; sterile bracts oblanceolate to linear, 3–6 mm long, 0.3–0.7 mm wide, pubescent like bracts. Bracteoles oblanceolate to spatulate to linear-elliptic, 9–12 mm long, 1.5–2.2 mm wide, abaxial surface and margins pubescent like bracts. Flowers sessile. Calyx 5-lobed, 5–6.5 mm long, lobes lanceolate, 4–5.5 mm long, abaxial surface sparsely pubescent with flexuose eglandular trichomes, margin pubescent like bracts. Corolla "dark and pale purple," 21 mm long, externally pubescent with glandular trichomes 0.1–0.3 mm long, tube 13 mm long, 2.7 mm in diameter near midpoint, little (if at all) expanded distally (i.e., undifferentiated into narrow proximal portion and throat), with an externally protruding pouch in lower half near where stamens attached, upper lip 8.5 mm long, 2-fid, lower lip 9 mm long. Stamens inserted in lower half of corolla tube, anthers not seen; pollen (fide Gibson 1972) 4-aperturate, apertures flanked on each side by 1 row of insulae (these sometimes ± partially coalesced). Style not seen. Capsule 8–11.5 mm long, pubescent with erect to flexuose eglandular trichomes 0.1–0.4 mm long, stipe 2.5–5.5 mm long, head 5.5–6.5 mm long. Seeds 4, lenticular, 2.3 mm long, 2.1 mm wide, lacking trichomes, surface appearing smooth (micropapillose).

PHONOLOGY.— Flowering: December; fruiting: December.

HABITATS.— Montane ridges and summits; 1200–1300 m.

Izabal: *Steyermark 41939* (type, see above).

Standley and Steyermark (1947) provided an illustration of this species in the protologue. Because Gibson's combination in *Justicia* for this species was a later homonym, Bennet and Chandra (1982) proposed another one for it.

This species is endemic to Guatemala (Izabal) and remains known only from the type collection. Although the exact locality of collection on Cerro San Gil is not known, the notation of its occurrence on the uppermost summit above 1200 meters reveals that the type locale lies within the Reserva Protectora de Manantiales Cerro San Gil. The conservation status of this species remains unknown, but it might be regarded as possibly extirpated until plants of it are relocated.

Justicia pectoralis **Jacq.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: December–May; fruiting: February–March.

HABITATS.— Lowland forests, short thickets, dry thickets, along streams, moist areas along roads; 50–1100 m.

Alta Verapaz: *Steyermark 44233* (F). **Escuintla**: *Standley 89141* (F). **Izabal**: *Contreras 7568* (F, LL, MO). **Petén**: *Steyermark 45495* (F, MICH, US). **Retalhuleu**: *Standley 87396* (F, US).

Gibson (1974) reported the occurrence of the species in Chiquimula and Guatemala, but no collections from those departments were located during this study.

Justicia pedicellata **D.N. Gibson, Fieldiana, Bot. 34:70. 1972.** TYPE.— GUATEMALA. **Alta Verapaz**: Samac to Chamá, ca. 1200 m, 23 Oct 1920, *H. Johnson 780* (holotype: F!; isotype: US!).

Perennial herbs or shrubs to 2 m tall. Young stems subterete to quadrate-sulcate, glabrous or nearly so. Leaves sessile to petiolate, petioles to 5 mm long, blades ovate to elliptic, 30–103 mm long, 11–33 mm wide, 2.7–4.1 times longer than wide, acuminate at apex, acute to subattenuate at base, surfaces glabrous (or abaxial surface sometimes glandular punctate), margin entire to subcrenate. Inflorescence of axillary and terminal pedunculate cymules; cymules usually opposite at nodes, 1–3 per axil of distal leaves or 1–3 (–6) at terminal node, peduncles 5–52 mm long, glabrous, outer cymule bracteoles green flecked with maroon to maroon, deltate to cordate, 12–21 mm long, 6.5–11 mm wide, equal to subequal in size, truncate to cordate at base, abaxial surface glabrous, inner cymule bracteoles sublinear to lance-ovate to ovate, 8–10.3 mm long, 1.8–3.5 mm wide, abaxial surface glabrous. Flowers 1 per cymule, sessile. Calyx 5-lobed, 7–8 mm long, tube 1 mm long, lobes lanceolate, 6–7 mm long, 0.9–1.2 mm wide, abaxially glabrous, margin sometimes sparsely ciliate with flexuose eglandular trichomes 0.1–0.2 mm long. Corolla red, 26–41 mm long, externally pubescent with mostly retrorse eglandular trichomes 0.2–0.4 mm long and sometimes with erect glandular trichomes 0.1–0.2 mm long as well, tube 16–25 mm long, gradually expanded from base, upper lip 12.5–17 mm long, apically emarginate, lower lip 12–16 mm long, lobes 1–2.5 mm long, 1–1.8 mm wide. Stamens 12–19 mm long, filaments distally glabrous, thecae 2.1–2.8 mm long, subequal (lower slightly longer), subparallel to subperpendicular, unequally inserted (overlapping by 0.6–1.2 mm), upper theca sparsely pubescent dorsally with eglandular trichomes and with a basal spur to 0.2 mm long, lower theca with a blunt basal appendage 0.3–0.6 mm long; pollen 3-aperturate, apertures flanked on each side by 1 row of insulae. Style 29–38 mm long, stigma 0.2 mm long, minutely 2-lobed. Capsule 9.5–11 mm long, glabrous, stipe 3–4.5 mm long, head ellipsoid, 6.5–7 mm long. Seeds 4, lenticular, 2.5–3 mm long, 1.9–2.3 mm wide, surfaces and margin pubescent with ± trichome-like papillae, 0.05–0.1 mm long, papillae sometimes very sparse or only evident on margin.

PHENOLOGY.— Flowering: October, February; fruiting: February–March.

HABITAT.— Cloud forests, riparian forests; 275–1350 m.

Alta Verapaz: *Daniel et al. 11355* (BIGU, CAS, K, MICH, MO, US).

Glandular trichomes are present on *Steyermark 44196* but they are not evident on the type. Gibson (1972) described pollen of this species as 2-aperturate; pollen of *Johnson 780* and *Véliz 95.4376* is 3-aperturate (Fig. 7). Gibson (1972) also provided an illustration of this species.

This Guatemalan endemic is known only from Alta Verapaz, where it has been collected at least six times, most recently during 2010 in the Sierra de Chamá (*Daniel et al. 11355* at BIGU, CAS, K, MICH, MO, US). The locality visited in 2010 consists of a four square kilometer cloud forest remnant in a region where much of the forest has been removed for agriculture and pasturage. At this site, the species is a common (more than 100 plants were noted) understory shrub both in and along the edge of the forest. Although the species is extant, it is restricted in distribution, and its overall conservation status remains unknown. It should be regarded as rare until additional information becomes available.

***Justicia pringlei* B.L. Rob.**

RECENT DESCRIPTIONS.— Daniel (1995b), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: unknown; fruiting: unknown.

HABITAT.— Unknown; elevation unknown.

Quiché: *Aguilar 1513* (F).

Aguilar's collection does not provide any information relating to specific locale, habitat, or date of collection. Although rare or possibly extirpated in Guatemala, this species is widespread in central to southern Mexico where it occurs in xerophytic scrub, oak savannas, and pine-oak forests at elevations from 920 to 2000 meters.

***Justicia ramosa* (Oerst.) V.A.W. Graham**

RECENT DESCRIPTIONS.— Daniel (1995b, 1999a).

PHENOLOGY.— Flowering: August–January; fruiting: August–January.

HABITATS.— Tropical deciduous forests, moist thickets, brushy slopes; 225–850 m.

El Progreso: *Cóbar & Ramírez 646* (BIGU). **Jutiapa**: *Standley 75836* (F). **Zacapa:** *Blake 7669* (holotype of *S. discolor* Blake: US; isotypes: F, GH).

Gibson (1972, 1974) included this taxon within *Siphonoglossa sessilis* (Jacq.) Oerst. ex Radlk., a closely related species as treated by Hilsenbeck (1989) that is not known from Guatemala. Although she attributed to herself the combination in *Siphonoglossa* for Jacquin's *Justicia sessilis*, as noted by Hilsenbeck (1989), it had been published previously by Radlkofer (1883). Although Gibson's superfluous combination is cited by *Index Kewensis* and the *Gray Herbarium Card Index*, Radlkofer's earlier and valid one is not.

Hilsenbeck (1989) treated *Siphonoglossa discolor*, known only by Blake's collection from Zacapa, as *S. ramosa* var. *discolor* (S.F. Blake) Hilsenb.; he noted the following distinctions for the variety: strongly discolorate leaves, cuneate leaf bases, usually prominent apiculate leaf apices, and short (0.1 mm long) and evenly disposed cauline pubescence. He treated two of Standley's collections from Jutiapa within *S. ramosa* var. *hondurensis* (Standl. & Steyerm.) Hilsenb. Daniel (2005) noted that the distinctions attributed to this variety among Honduran plants were untenable, and neither variety is recognized herein.

***Justicia ramulosa* (Morong) C. Ezcurra, Bol. Soc. Argent. Bot. 25:350. 1988.** *Beloperone ramulosa* Morong, Ann. New York Acad. Sci. 7:194. 1893. *Justicia ramulosa* (Morong) V.A.W. Graham, Kew Bull. 43:604. 1988. TYPE.— PARAGUAY. **Asunción**: "central Paraguay," 1888–1890, *T. Morong 706* (holotype: NY; isotypes: BM, E, G, K, MO, NY, US!).

Beloperone tetramerioides Lindau, Bull. Herb. Boissier 3:488. 1895. *Justicia tetramerioides* (Lindau) V.A.W. Graham, Kew Bull. 43:603. 1988. TYPE.— BOLIVIA. **Santa Cruz**: Yapacani, 400 m, July 1892, *O. Kuntze s.n.* (holotype: B, destroyed; isotype: NY).

Beloperone cochabambensis Rusby, Mem. Torrey Bot. Club 6:103. 1896. *Justicia cochabambensis* (Rusby) V.A.W. Graham, Kew Bull. 43:603. 1988. TYPE.— BOLIVIA. **Cochabamba**: "Espirito Santo," vicinity of Cochabamba, 1891, A. *Bang 1215* (holotype: NY; isotypes: BM, E, G, K, M, MO, NY, US! W).

Beloperone pseudociliata Mildbr., Notizblatt 9:1159. 1927. *Justicia pseudociliata* (Mildbr.) V.A.W. Graham, Kew Bull. 43:603. 1988. TYPE.— BOLIVIA. **Santa Cruz**: Río Palometillas, Buenavista, 450 m, 24 Jun 1925, *I. Steinbach 7137 bis* (holotype: B, destroyed; isotypes: BM, K, MO, NY, UC)

Chaetothylax cuspidatus D.N. Gibson, Fieldiana, Bot. 34:58. 1972, non *J. cuspidata* Vahl (1790). *Justicia danielii* L.H. Durkee, Novon 9:508. 1999. TYPE.— GUATEMALA. **Alta Verapaz**: Roblaron, valley of the Sta. Lucia, road from Gualán to Copán, 650 m, January 1907, *H. Pittier 1792* (holotype: US!).

Perennial herbs to 4 dm tall. Young stems subquadrate, 2-fariously pubescent with flexuose to retrorse eglandular trichomes 0.5–1.7 mm long. Leaves petiolate, petioles to 20 mm long, blades ovate to elliptic, 30–105 mm long, 15–45 mm wide, 2.0–3.1 times longer than wide, acute to acuminate at apex, acute to attenuate at base, surfaces pubescent with mostly retrorse eglandular trichomes concentrated on (or restricted to) major veins, margin entire. Inflorescence of axillary (near shoot apex) and terminal dichasiate spikes, spike rachises ± 2-fariously pubescent with flexuose eglandular trichomes (especially at nodes), dichasia opposite, sessile, 1-flowered. Bracts opposite, obovate-elliptic to obovate, 11.5–16 mm long, 3.3–6 (–7.5) mm wide, aristate at apex, mucro to 2 mm long, abaxial surface sparsely pubescent with antrorse eglandular trichomes 0.3–1.2 mm long, margin ciliate with flexuose eglandular trichomes to 2.2 mm long. Bracteoles subulate, 6–10 mm long, 0.5–0.7 mm wide, abaxial surface nearly glabrous or pubescent like bracts, margin pubescent like bracts. Calyx 4-lobed, 6.5–8.5 mm long, lobes subulate, 6–8 mm long, 0.5–0.8 mm wide, abaxially and marginally pubescent like bracteoles. Corolla reddish purple, 31–34 mm long, externally pubescent with flexuose eglandular trichomes 0.1–0.6 m long, tube ± gradually expanded distally, 21–22 mm long, 1.5–2 mm in diameter near midpoint, upper lip 9–12 mm long, shallowly 2-lobed at apex, lobes 0.3 mm long, lower lip 10–14 mm long, lobes 5–5.5 mm long, 2.3–3.5 mm wide. Stamens 9 mm long, filaments pubescent with eglandular trichomes near base, glabrous distally, thecae subparallel to subperpedicular, 0.9–1.5 mm long, subequal to unequal in size (upper theca larger, lower theca sometimes abortive or not evident), glabrous, superposed (contiguous or with a gap 0.05–0.5 mm), lower theca with a basal appendage to 0.3 mm long; pollen 2-aperturate, apertures flanked on each side by 2 (–3) rows of insulae. Style 27 mm long, glabrous distally, stigma 0.5 mm long, inconspicuously 2-lobed. Capsule 6–8 mm long, pubescent with flexuose to retrorse eglandular trichomes 0.05–0.2 mm long, stipe 1.5–3 mm long, head subellipsoid with slight medial constriction, 4.2–5 mm long. Seeds lenticular to sublenticular, 1.5–1.9 mm long, 1.4–1.8 mm wide, covered with stout papillae bearing retrorse barbs.

PHENOLOGY.— Flowering: January; fruiting: unknown.

HABITATS.— Moist forests, disturbed sites (e.g., cafetales); 650 m.

Alta Verapaz: *Pittier 1792* (type of *Chaetothylax cuspidatus*, see above).

Because this widespread pecies is not well collected in Guatemala, the description above has been augmented with information from specimens occurring elsewhere in Central America. Guatemalan plants of *J. ramulosa* were treated by Gibson (1974) as *Chaetothylax cuspidatus*. Ezcurra (2002) noted that the South American species *J. ramulosa* was similar to the North American species *Chaetothylax cuspidatus* and *J. teletheca* T.F. Daniel. Indeed, Lindau had annotated the type of *C. cuspidatus* from Guatemala as *Beloperone ramulosa*. Daniel (2005) treated the former name as a synonym of *J. ramulosa*; the latter species can be distinguished by the following couplet:

1. Inflorescence rachis pubescent with both glandular and eglandular trichomes distally (glandular pubescent); bracts apically acute, distal bracts abaxially and marginally glandular pubescent; bracteoles 4–6 mm long, 0.3–0.5 mm wide; calyx 9–11 mm long, lobes linear to linear-lanceolate; corolla externally glandular pubescent, tube 17–19 mm long; anther thecae separated by a gap of 1.5–3 mm, distal theca 2–2.5 mm long; pollen with 3–4 rows of insulae on each side of apertures; capsules glandular pubescent . . . . *J. teletheca*

1. Inflorescence rachis pubescent throughout with eglandular trichomes only; bracts apically aristate (mucros to 2 mm long), distal bracts abaxially and marginally pubescent with eglandular trichomes only; bracteoles 6–10 mm long, 0.5–0.7 mm wide; calyx 6.5–8.5 mm long, lobes subulate to lanceolate; corolla externally pubescent with eglandular trichomes only, tube 21–22 mm long; anther thecae contiguous or separated by a gap of 0.05–0.5 mm, distal theca up to 1.5 mm long; pollen with 2 (–3) rows of insulae on each side of apertures; capsule pubescent with eglandular trichomes only . . . . *J. ramulosa*

***Justicia sangilensis* T.F. Daniel & M. Véliz**

RECENT DESCRIPTION.— Daniel and Véliz (2009).

PHENOLOGY.— Flowering: October, January; fruiting: October, January.

HABITAT.— Lower montane rain forests; ca. 875 m.

Izabal: *Daniel et al. 11249* (holotype: BIGU; isotypes: BR, CAS, F, K, MO, US).

This distinctive species was recently described from the Cerro San Gil where it is endemic; Daniel and Véliz (2009) provided an illustration and photographs of the species and its pollen. It differs from other *Justicia* by the combination of its arboreal (to 8 m tall) habit, reddish involucre of four cymule bracteoles subtending each flower, and large yellowish corollas. It is known only from two sites in the Reserva Ecológica de Cerro San Gil; at each one it is locally abundant. Although not in imminent danger of extinction, this highly unusual species should be regarded as rare.

***Justicia silvicola* D.N. Gibson, Fieldiana: Bot. 34:73. 1972.** TYPE.— GUATEMALA. **Izabal**: Cerro San Gil, uppermost ridges and summit, 1200–1300 m, 26–27 Dec 1941, *J. Steyermark 41984* (holotype: F!; isotype: US!).

Perennial herbs to 5 dm tall. Young stems quadrate-sulcate to ± flattened, glabrous (or with some internodes ± 2-fariously pubescent with erect subglandular trichomes to 0.1 mm long). Leaves petiolate, petioles to 13 mm long, blades ovate-elliptic to elliptic, 40–120 mm long, 19–42 mm wide, 2.1–3.2 times longer than wide, acuminate to apex, subattenuate to attenuate at base, surfaces glabrous, margin ± entire. Inflorescence of terminal subspicate axes to 15 mm long (excluding flowers), rachis glabrous; dichasia opposite in axils of bracts (or lowest pair in axils of distal pair of leaves), 1 per axil, 1-flowered, subsessile (i.e., borne on peduncles to 1 mm long). Bracts obovate-spatulate, 9–10 mm long, 3–3.5 mm wide, abaxial surface glabrous. Bracteoles oblanceolate-spatulate, 5–8 mm long, 1.2–1.5 mm wide, abaxial surface glabrous. Flowers sessile. Calyx 6–6.5 mm long, lobes lanceolate, 4.5–5.5 mm long, 0.7–1 mm wide, abaxially glabrous. Corolla "white," 18–19 mm long, externally glabrous, tube 13–14 mm long, narrow proximal portion 9–10 mm long, 1.2–1.5 mm in diameter near midpoint, ± abruptly expanded distally into a throat, throat 2–3 mm long, upper lip 6 mm long, lower lip 6.5 mm long, lobes 3–5 mm long, 2.7–6.5 mm wide. Stamens 4.6 mm long, inserted at base of throat, filaments glabrous, thecae 1.3–1.8 mm long, unequal in size (lower larger), unequally inserted (overlapping by 0.5–0.6 mm), upper theca dorsally pubescent with eglandular trichomes, lower theca with a spurlike basal appendage 0.7–0.8

mm long; pollen (fide Gibson 1972) 4-aperturate, apertures flanked on each side by 2 rows of insulae. Style and stigma not seen. Capsule 11–12 mm long, glabrous, stipe 5 mm long, head subellipsoid. Seeds lenticular, 2.8–3 mm long, 2 mm wide, surfaces and margin covered with apically barbed or branched papillalike trichomes to 0.1 mm long.

Phenology.— Flowering: December; fruiting: December.

Habitats.— Montane ridges and summits; 1200–1300 m.

Izabal: *Steyermark 41984* (type, see above).

One of the distinctive features of the species, apically barbed or branched trichomes on the seeds, is encountered in several other species from North America and Central America (e.g., *J. pringlei* B.L. Rob., *J. wendtii* T.F. Daniel, *J. wrightii* A. Gray). None of these is otherwise especially similar to *J. silvicola*.

Justicia silvicola is endemic to Guatemala (Izabal), and remains known only from the type collection. Although the exact locality of collection on Cerro San Gil is not known, the notation of its occurrence on the uppermost ridges and summit above 1200 meters reveals that the type locale lies within the Reserva Protectora de Manantiales Cerro San Gil. The conservation status of this species remains unknown, but it might be regarded as possibly extirpated until plants of it are relocated.

***Justicia soliana* Standl.**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: October–March; fruiting: November–March.

Habitats.— Wet forests, dry forests, wet thickets, dry thickets, rocky slopes; 500–1300 m.

Local name.— "La aurora" (*Aguilar 429*)

Chiquimula: *Molina R. & Molina 25153* (F, MO, US). **Escuintla**: *Standley 64858* (F). **Guatemala**: *Aguilar 429* (F). **Jutiapa**: *Steyermark 31886* (F, US). **Sacatepéquez**: *Molina R. et al. 16676* (F, US). **Santa Rosa**: *Standley 78586* (F, US).

***Justicia spicigera* Schltdl.**

Recent descriptions.— Daniel (1995b, 1997b), Daniel and Acosta (2003).

Phenology.— Flowering: December–May; fruiting: March.

Habitats.— Tall forests, moist thickets; 0–1790 m.

Local names.— "Añil" (*Contreras 895*); "jiquilite" (*Sálas 663*); "sacatinta" (*Tejada 324*); "sacatinte" (*Cutler 4327*); "Santo Domingo" (*Morales R. 1274*); "tinta" (*Standley 68367*; *Steyermark 33707*).

Local uses.— Leaves used for blue dye (*Cutler 4327*); plant used medicinally to treat dysentery (fide mother of L. Velásquez, pers. comm.).

Alta Verapaz: *Johnson 316* (F, US). **Chimaltenango**: *Cutler 4327* (F). **Guatemala**: *Morales R. 1274* (AGUAT, F). **Huehuetenango**: *Tejada 324* (US). **Izabal**: *Jones & Facey 3473* (CAS, RSA). **Petén**: *Contreras 2192* (F, MO, LL). **Quezaltenango**: *Standley 68367* (F). **Retalhuleu**: *Donnell-Smith 2700* (US). **Sololá**: *Kellerman 5686* (LL, US).

This species, along with *J. colorifera*, has a lengthy history of both domestic and medicinal uses (see Daniel 1995b), and they are both cultivated in much of northern Latin America. *Lundell & Contreras 19164* from Baja Verapaz (see above under *J. colorifera*) is similar to both *J. spicigera* and *J. colorifera*. It differs from the former by the corolla bud not fusiform, the lower lip apparently not recoiled, and the proximal portion of the corolla tube lacking minute glands. It differs from the latter by the pubescence on its young stems and rachises. Its pollen (2-aperturate with apertures flanked on each side by 2 rows of insulae) is similar to that of both of *J. spicigera* and *J. colorifera*. It differs from both of these species by having pink corollas (based on data provided by the collector). A very similar plant from Alta Verapaz at F (*Standley 69470*; see above under *J. colorifera*) has this same combination of characters except that collector's notes indicate pale red corollas. Plants of this collection were noted to be common in gardens and hedges. The taxonomic disposition of these anomolous collections must await additional studies.

Justicia steyermarkii **Standl. & Leonard in P.C. Standley and J.A. Steyermark, Publ. Field Mus. Nat. Hist., Bot. 23:243. 1947, non *J. steyermarkii* (Leonard) Leonard (1958).** Type.— GUATEMALA. **Huehuetenango**: Sierra de los Cuchumatanes, between Xoxlac and Nucapuxlac, 1650–2500 m, 17 Jul 1942, *J. Steyermark 48934* (holotype: US!; isotype: F!).

Perennial herbs to shrubs to 1.2 m tall. Young stems quadrate-sulcate, pubescent with antrorse eglandular trichomes 0.2–0.4 mm long, trichomes concentrated in (but not restricted to) 2 lines, often with dark septae. Leaves petiolate, petioles to 10 mm long, blades lance-ovate to ovate, 16–65 mm long, 4–19 mm wide, 3.4–4.5 times longer than wide, acuminate at apex, acute to subattenuate at base, surfaces pubescent with antrorse eglandular trichomes, margin entire. Inflorescence of axillary mostly pedunculate spikes to 12 mm long (including peduncle and excluding flowers); spikes mostly opposite in axils of distal leaves (leaves becoming much reduced in size distally), 1 per axil, subsessile to pedunculate, peduncles 0.5–4.5 mm long, pubescent like young stems or with trichomes more evenly disposed, rachis pubescent like peduncles; dichasia alternate, sessile in axils of bracts, 1 per axil, 1-flowered. Bracts opposite, sterile and fertile ones ± heteromorphic (fertile bracts slightly larger than sterile ones), spatulate, 4.5–10 mm long, 1.5–2.5 mm wide, abaxial surface pubescent with antrorse eglandular trichomes 0.05–0.2 mm long, margin ciliate with flexuose eglandular trichomes to 0.6 mm long. Bracteoles spatulate, 3–8 mm long, 1–1.7 mm wide, abaxial surface pubescent like bracts and sometimes with glandular trichomes to 0.2 mm long as well. Flowers sessile. Calyx 5-lobed, 5–6 mm long, lobes lance-subulate, 4–5 mm long, 0.8–1 mm wide, abaxially pubescent like bracts. Corolla "dull purple" and white with dull purple markings on lower lip, 21 mm long, externally pubescent with erect to flexuose eglandular trichomes 0.05–0.3 mm long, tube 8 mm long, narrow proximal portion 2 mm long, abruptly expanded into throat, throat 6 mm long, upper lip 13 mm long, apically 2-fid, lower lip 10 mm long, lobes 1.5–2 mm long, 2–3 mm wide. Stamens 11 mm long, thecae 2–2.2 mm long, subperpendicular, subequal in size, unequally inserted (overlapping by up to 1 mm), both theca dorsally pubescent with eglandular trichomes, lower theca with a basal appendage to 0.5 mm long; pollen unknown. Style 19 mm long, pubescent with eglandular trichomes, stigma 0.1 mm long, lobes (if present) not evident. Capsule not seen.

Phenology.— Flowering: July; fruiting: unknown.

Habitat.— Unknown; collected between "1500–2600" m.

Huehuetenango: *Steyermark 48590* (F, US).

An illustration of this species was provided in the protologue (Standley and Steyermark 1947).

Justicia steyermarkii is endemic to Guatemala (Huehuetenango) and remains known only by Steyermark's two collections made in 1942 from the Sierra de los Cuchumatanes. This mountain range is rich in endemics, and remains inadequately explored. Although its conservation status is unknown, the species might be regarded as possibly extirpated until plants of it are relocated.

Justicia sulfurea **(Donn. Sm.) D.N. Gibson**

Recent Description.— Daniel (2004a).

Phenology.— Flowering: September–October; fruiting: January.

Habitats.— Disturbed forests, moist thickets, along streams, rocky slopes; 1140–1500 m.

LOCAL NAME.— "Sacatinta" (*Molina R. & A. Molina 27794*).

Baja Verapaz: *Molina R. & Molina 27794* (EAP, F, TEX, USCG). **Santa Rosa**: *Heyde & Lux 6215* (lectotype: US; isolectotypes: A, F, GH, MO, US).

Gibson (1972, 1974) noted that this rarely collected species was known to her only from the type collection. Other collections resembling the type have since been located, including one in El Salvador (Daniel 2001, 2004a). The most recent known collection of *J. sulfurea* was made in 1972 by the Molinas in Guatemala. Pollen of this species, which is nearly endemic to Guatemala, was illustrated by Daniel (2004a).

Justicia tianguensis T.F. Daniel

RECENT DESCRIPTIONS.— Daniel (1995a, 1995b).

PHENOLOGY.— Flowering: February; fruiting: unknown.

HABITATS.— Wet mixed forests, thickets, along streams; "1300–1500" m.

Alta Verapaz: *Williams et al. 40603* (F).

Gibson (1974) annotated and treated the collection cited above as *J. inaequalis*. In the protologue of *J. tianguensis* (Daniel 1995a), in which William's collection was cited as a paratype, the distinctions between these two taxa were enumerated. *Justicia tianguensis* is endemic to, and apparently rare throughout its range in, Guatemala and Chiapas.

Justicia valvata T.F. Daniel

RECENT DESCRIPTIONS.— Daniel (1993c, 2003).

PHENOLOGY.— Flowering: December; fruiting: unknown.

HABITAT.— Tall forests; elevation ca. 200–300 m.

Petén: *Contreras 9311* (F, K, LL, MO, PH, S, US).

Although known from a single locale in Guatemala, *J. valvata* has been collected several times in Veracruz, Mexico. Daniel (2003) treated this and three other species of *Justicia* in section *Megalostoma* (see below under *J. viridescens*). Another collection (*Contreras 8854* at F, LL, MO, S, US) from a region in Petén (La Cumbre, Cadenas Road at KM 160 west) near to where *Contreras 9311* was collected (Los Arcos, Cadenas Road at KM 143 west) also pertains to this section. Although it lacks corollas, based on its inflorescence (e.g., pedunculate dichasia) and pubescence (e.g., evenly pubescent young stems with the trichomes antrorsely appressed and up to 1 mm long, and abaxially pubescent calyx lobes) it appears more like *J. tabascina* from Mexico that to either of the Guatemalan species of section *Megalostoma*. It differs from *J. tabascina* by its somewhat longer cauline trichomes, antrorsely appressed and longer trichomes on the calyx, dichasia borne in the axils of distal leaves instead of in axils of bracts, and longer bracteoles. Study of corollas and pollen from plants similar to *Contreras 8854* should help determine their taxonomic disposition.

Justicia velizii T.F. Daniel, sp. nov.

Figure 10

TYPE.— GUATEMALA. **Izabal**: Quebrada Seca, ca. 9.2 km (air) NW of Río Dulce, 15°41'52.1"N, 89°04'48.6"W, 165 m, lowland rain forest, in floodplain of river, limestone parent material, 25 January 2009, *T. Daniel and M. Véliz 11257* (holotype: BIGU!; isotypes: BR! CAS! F! K! MICH! MO! TEX! US!).

Perennis caulibus usque ad 3 m altis. Folia petiolata, laminae ovatae vel ovato-ellipticae, 60–200 mm longae, 15–86 mm latae, 1.9–4-plo longiores quam latiores. Inflorescentia floribus in spicas axillares et secundas vel in paniculam. Bracteae triangulares vel subulatae, 1–2.6 (–4) mm longae. Calyx 4-lobus, 7–12.5 mm longus. Corolla rosea vel rubra, 32–48 mm longa. Stamina the-

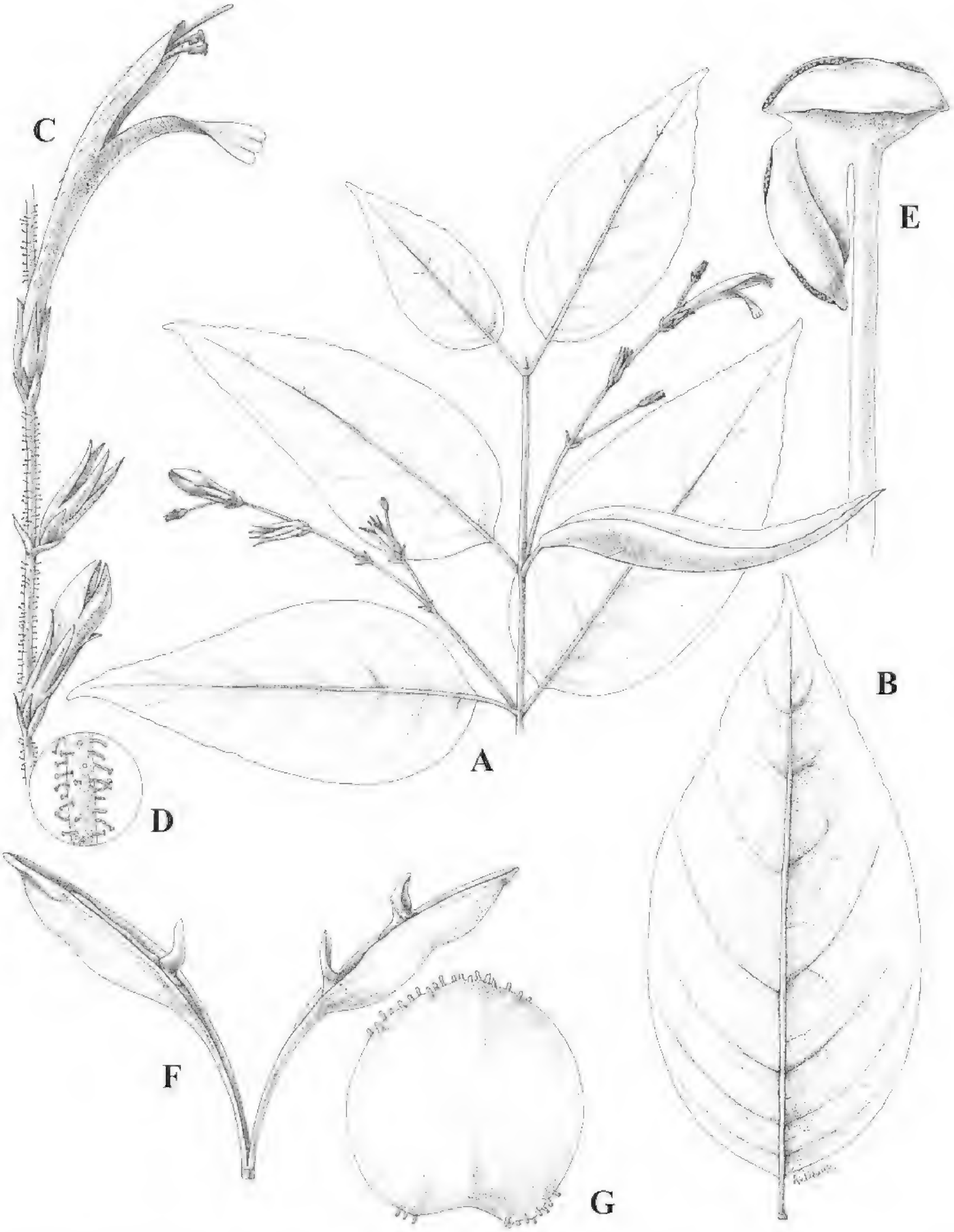


FIGURE 10. *Justicia velizii*. A. Habit (*Contreras 6183*), × 0.5. B. Leaf (*Contreras 6183*), × 0.6. C. Inflorescence with flower (*Contreras 6183* and *8890*), × 1.5. D. Trichomes of rachis (*Contreras 6183*), × 4.3. E. Distal portion of stamen with anther (*Contreras 8890*), × 12. F. Capsule (*Contreras 9354*), × 2.1. G. Seed (*Contreras 9354*), × 6. Drawn by A. Whitesides.

cis 1.5–2.8 mm longis, subparallelis vel subperpendicularibus, subaequaliter vel inaequaliter insertis, basi ecalcaratis (vel inferiore calcare usque ad 0.05 mm longo instructa). Pollen granae 2-aperturatae. Capsula 22–28 mm longa, glabra.

Perennial herbs or shrubs to 3 m tall. Young stems subquadrate to quadrate-sulcate, bifariously pubescent with (flexuose to) antrorse to antrorsely appressed eglandular trichomes 0.2–0.5 mm long. Leaves petiolate, petioles to 20 mm long, blades subcoriaceous, ovate to ovate-elliptic, 60–200 mm long, 15–86 mm wide, 1.9–4 times longer than wide, acuminate to subfalcate at apex, rounded to acute at base, abaxial surface nearly glabrous to sparsely pubescent with antrorsely appressed eglandular trichomes along major veins, adaxial surface essentially glabrous or with a few antrorsely appressed eglandular trichomes, margin entire to subcrenate. Inflorescence of axillary pedunculate secund dichasiate spikes or panicles of spicate axes to 105 mm long (including peduncles and excluding flowers), 2.5–4 mm in diameter near midspike (excluding flowers); spikes (or panicles) alternate to opposite, 1 per axil, peduncles to 25 mm long, evenly pubescent with flexuose glandular trichomes 0.2–0.7 mm long, rachis pubescent like peduncles; dichasia alternate (i.e., 1 per node), 1-flowered, 1 per axil, sessile. Bracts opposite, triangular to subulate, 1–2.6 (–4) mm long, 0.6–1.4 mm wide, abaxial surface pubescent with antrorsely appressed eglandular trichomes 0.1–0.3 mm long and sometimes with an overstory of glands like those of peduncle/rachis or sometimes nearly glabrous. Bracteoles subulate to lance-subulate, 2.5–5 mm long, 0.6–1 mm wide, abaxial surface pubescent like bracts. Flowers sessile to subsessile (i.e., with peduncles to 1 mm long). Calyx 4-lobed, 7–12 mm long (accrescent in fruit to 12.5 mm long), lobes lanceolate to lance-linear, subequal, 6–9 (–10.5) mm long, 1–1.3 (–1.7) mm wide, widest at base or near middle, abaxially sparsely pubescent with antrorsely appressed eglandular trichomes to nearly glabrous, margin neither thickened nor discolored. Corolla pink to red, (26–) 30–48 mm long, externally pubescent with flexuose to retrorse eglandular trichomes 0.1–0.3 mm long, tube gradually expanded distally, 18–26 mm long, 1.4–2.1 mm in diameter near midpoint, upper lip 12–20 mm long, ± entire, lower lip 11–20 mm long, lobes 2.5–4.2 mm long, 1.7–2 mm wide. Stamens inserted near apex of corolla tube, 14–20 mm long, thecae 1.5–2.8 mm long, subequal to unequal (upper theca longer), subparallel to perpendicular, subequally to unequally inserted (overlapping by up to 2 mm), dorsally glabrous, lacking basal appendages (or lower theca with an inconspicuous appendage to 0.05 mm long); pollen 2-aperturate, apertures flanked on each side by 2–3 rows of insulae. Style 33.5–43 mm long, glabrous, stigma 0.1–0.2 mm long, lobes not evident. Capsule 22–29 mm long, glabrous, stipe 9–13 mm long, head obovoid to ellipsoid, 11–16 mm long. Seeds 4, greenish when young, lenticular (i.e., plano-convex), 5–6.3 mm long, 4–5.5 mm wide, surfaces and margin covered with subconic tubercles to 0.4 mm long, tubercles more prominent and longer on immature seeds, sometimes becoming ± restricted to margin at maturity.

Phenology.— Flowering: January–April, August–September; fruiting: April, August–September, December–January.

Habitat.— Lowland rain forests, tall forests [in a region of tropical broadleaf evergreen forests], along streams; 0–600 m. The lowland forests in which this species occurs are dominated by *Dendropanax arboreus*, *Quararibea funibris*, *Q. yunckeri* ssp. *izabalensis*, *Calophyllum brasiliense* var. *rekoi*, *Phyllanthus austinii*, *Swartzia standleyi*, *Blakea bella*, *Parathesis belizensis*, *Manilkara achras*, *Terminalia nyssaefolia*, *Psychotria chiapensis*, *Pouteria mammosa*, *Sloanea tuerckheimii*, and *Tabermontana chrysocarpa*. Other Acanthaceae occurring in the immediate vicinity of the type collection include: *Aphelandra aurantiaca*, *Justicia breviflora*, *J. fimbriata*, and *Odontonema hondurense*.

Paratypes.— GUATEMALA. **Izabal**: Chocón Machacas, 18 III 2003, *G. Cazali et al. 3200* (BIGU, USCG); Río Chacón, *H. Johnson 1190* (US); Biotopo Chocón, Cerro Mal Cocinado, 15°47'00"N, 89°50'45"W, 11 IV 2001, *J. Morales 954* (USCG); Montañas de Mico, 7–8 km W of Santo Tomás de Castilla on road to microwave tower, *W. Stevens et al. 25590* (MO, USCG); Livingston, Quebrada Seca, 27 VI 1998, *M. Véliz 98.6198* (BIGU, MO), 1 VIII 1998, *M. Véliz 98.6458* (BIGU); Mpio. Livingston, Río Dulce, Aldea La Libertad, Quebrada Seca, 15°41'52.1"N, 80°04'48.6"W, *M. Véliz & T. Daniel 20600* (BIGU), *20602* (BIGU). **Petén**: La Cumbre, W of KM 140 on Cadenas Rd., *E. Contreras 6183* (F, LL, MO, US); La Cumbre, Pusila, 5 km from La Cumbre bordering Pusila River, 2 km S of the village, *E. Contreras 8890* (LL, MO, US); Los Arcos, Cadenas Rd., on KM 143/144, west, *E. Contreras 9354* (LL, MO, US).

This species is endemic to Guatemala (Izabal, southeastern Petén). The type was collectd from an extensive population (more than 100 plants) in the floodplain of a river. Based on the number of recent collections of this species, and its occurrence in a region of some 1800 sq. km., the species would not appear to be rare or threatened at the present time. Many collectors have noted that corollas are pink; the type has red corollas; and *Cazali et al. 3200* noted yellow flowers.

Because inflorescences of *J. velizii* may be either simple spikes or panicles of spikes, the species does not fit neatly into one of Graham's (1988) infrageneric taxa. If the inflorescence is treated as compound (i.e., a panicle of spicate axes), the species appears to have affinities to her section *Sarotheca* (Nees) Benth. Plants with simple spikes would "key" to her section *Dianthera* subsect. *Saglorithys* (Rizzini) V.A.W. Graham. Pollen like that of *J. velizii* is not known from either of these sections. However, this type of pollen is known from her section *Plagiacanthus* (Nees) V.A.W. Graham, and it was as "peripheral" to this section that she treated *J. inaequalis*. Indeed, collections of *J. velizii* have usually been identified as *J. inaequalis*, and the two species share a number of similarities (e.g., habit, inflorescence type, calyx lobe number, corolla form and color, pollen sculpturing). However, *J. inaequalis* differs from Graham's characterization of section *Plagiacanthus* in several important characters including its 4-lobed calyx and smooth seeds. Thus, the infrageneric affinities of both of these species remain to be determined. They can be disginguished from one another by the characters in the following couplet:

1. Inflorescence peduncles and rachis evenly pubescent with flexuose glands 0.3–0.7 mm long; leaves subcoriaceous; bracts 1–2.6 (–4) mm long, abaxially pubescent with antrorsely appressed eglandular trichomes 0.1–0.3 mm long and sometimes with a sparse overstory of glands like those on peduncles and rachis (rarely nearly glabrous); calyx 7–12 mm long (during anthesis), lobes 6–9 (–10.5) mm long, 1–1.3 (–1.7) mm wide, margins not thickened or discolored; capsule 22–29 mm long; seeds 5.2–6.3 × 4–5.5 mm, surfaces and margin covered with subconic tubercles to 0.4 mm long, tubercles more prominent and longer on immature seeds, sometimes becoming ± restricted to margin at maturity; plants of moist to wet lowland forests at 0–600 m.. . . . . *J. velizii*

1. Inflorescence peduncles and rachis glabrous (or very nearly so); leaves membranaceous; bracts 3–5 mm long, abaxially glabrous; calyx 11–18 mm long (during anthesis), lobes 10–17 mm long, 1.5–2.5 mm wide, margins noticeably thickened or discolored; capsule 16–20 mm long; seeds 3.3–3.5 × 2.4–2.5 mm, surfaces and margin covered with low, rounded tubercles to 0.05 mm high; plants of moist to wet lowland, montane, and cloud forests at 450–2400 m . . . . *J. inaequalis*

Another congener in the region that superficially resembles both *J. inaequalis* and *J. velizii* is the Chiapan endemic *J. tianguensis*. However, it differs from both by its calyx (five-lobed with four large lobes and one small lobe vs. equally four-lobed), bracts (lanceolate to lance-ovate and 1.6–2.5 mm wide vs. triangular to subulate and 0.6–1.4 mm wide), and inflorescence (dichasia/flowers opposite at nodes, the spike not secund vs. dichasia/flowers one per node, the spike secund).

Justicia viridescens (Leonard) T.F. Daniel

Recent Description.— Daniel (2003).

Phenology.— Flowering: January, May, September; fruiting: January.

Habitats.— Lowland rain forests, wet forests, tall perennial forests; near sea level–120 m.

Izabal: *Standley 72948* (holotype of *Megalostoma viridescens* Leonard: F, isotype: US).

Gibson (1974) provided an illustration of this species, which she treated as *Megalostoma viridescens*. Daniel (2003) treated *Megalostoma* as congeneric with *Justicia*, aligned this unusual species with three others from nearby regions of Mexico and Guatemala, and placed all four into a new section (*Megalostoma*) of the genus. *Justicia viridescens* is known only from the moist region around the Bahía de Gálvez near Puerto Barrios, where it has been collected at least five times and as recently as 2009 (e.g., *Daniel et al. 11241*). Some or all of its distributional range appears to be located within one or more protected regions encompassing the Cerro San Gil. Although this species appears to be rare and restricted in its distribution, it can be locally abundant; ca. 30 plants were observed along 100 meters of roadway in 2009.

Justicia williamsii T.F. Daniel, stat. et nom. nov.

Figure 11

Justicia macrantha var. *piliformis* D.N. Gibson, Fieldiana. Bot. 34:70. 1972. Type.— GUATEMALA. **Sololá:** above Lake Atitlán, ca. 3–5 km W of Panajachel, 2100 m, mixed forest area on montane slopes, 6–7 December 1963 (flr), *L. Williams et al. 25314* (holotype: F!; isotype: US!).

Arching shrub to 4 m tall. Young stems subterete to subquadrate, ± evenly pubescent with flexuose to retrorse eglandular trichomes 0.4–1.2 mm long. Leaves petiolate, petioles to 10 mm long, blades ovate to elliptic, 27–100 mm long, 12–52 mm wide, 1.8–2.7 times longer than wide, surfaces pubescent (especially along major veins) with flexuose to antrorse eglandular trichomes to ± glabrate, abaxial surface conspicuously "punctate" with dark circular projections 0.05–0.1 mm in diameter, margin entire, ciliate with flexuose to antrorse eglandular trichomes. Inflorescence of axillary pedunculate dichasiate spikes to 20 mm long (including peduncles and excluding flowers) from axils of distal leaves that are sometimes ± reduced in size (see discussion below); spikes opposite, 1 per axil, peduncle of spikes to 11 mm long, evenly pubescent with retrorse eglandular trichomes 0.3–1 mm long, rachis evenly pubescent with retrorse eglandular trichomes 0.3–1 mm long or becoming very sparsely pubescent; dichasia 2 (–3) per spike, alternate, 1 per axil, sessile, 1-flowered. Bracts opposite, linear-elliptic to lance-triangular to triangular, 1–4 mm long, 0.8–1.3 mm wide, abaxial surface pubescent with flexuose to retrorse eglandular trichomes 0.1–0.4 mm long to glabrate. Bracteoles triangular to lance-triangular to ovate, 1.5–2.2 mm long, 0.7–0.9 mm wide, abaxial surface pubescent with erect to flexuose to retrorse eglandular trichomes 0.1–0.3 mm long to glabrate. Flowers sessile to subsessile (i.e., borne on pedicels to 0.5 mm long). Calyx 5-lobed, 5–6 mm long (up to 7 mm long in fruit), lobes lanceolate to lance-ovate, equal, 4–4.8 mm long, 1.3–2 mm wide, abaxially pubescent with erect to flexuose eglandular trichomes 0.1–0.4 mm long to glabrate, margin ciliate with flexuose to erect eglandular trichomes 0.1–0.6 mm long. Corolla red, 50–63 mm long, externally pubescent distally with erect to flexuose eglandular trichomes 0.05–0.3 mm long, glabrous proximally, tube gradually expanded distally, 26–35 mm long, 2.5–3.5 mm in diameter (measured flat) near midpoint, upper lip 23–28 mm long, erose at apex, lower lip 21–28 mm long, 3-lobed, lobes 1.5–3 mm long, 2–3.2 mm wide. Stamens inserted near apex of corolla tube, (16–) 23–27 mm long, exserted from mouth but not extending beyond upper lip, filaments glabrous, thecae 1.9–2.7 mm long, equal in size, parallel, equally to subequally inserted, glabrous, lacking basal appendages; pollen 2-aperturate, apertures flanked on each side by

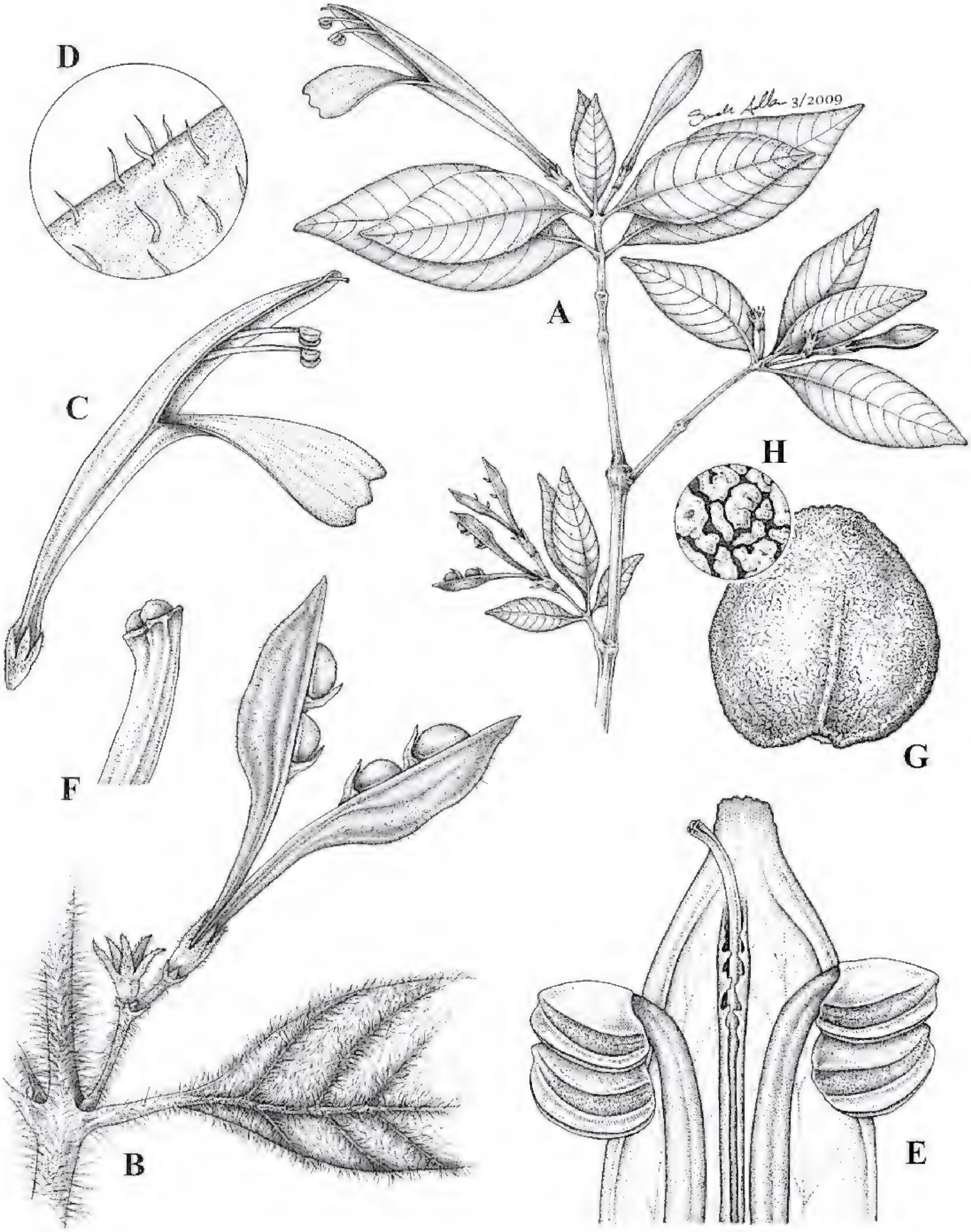


FIGURE 11. *Justicia williamsii* (*Daniel & Barreno 11265*). A. Habit, × 0.66. B. Inflorescence with capsule, × 2. C. Flower, × 1.2. D. Trichomes on external surface of upper lip of corolla, × 30. E. Ventral surface of upper lip of corolla showing style in rugula and distal portions of stamens, × 7.2. F. Distal portion of style with stigma, × 30. G. Seed, × 8. H. Seminal surface, × 35. Drawn by S. Adler.

1–2 rows of ± obscure insulae. Style 51–63 mm long, often decurved near apex, sometimes extended beyond upper lip, proximally glabrous or pubescent with eglandular trichomes, stigma 0.1 mm long, ± equally 2-lobed. Capsules 21–33 mm long, externally ± sparsely pubescent distally with straight to flexuose eglandular trichomes 0.1–0.2 mm long to glabrate, stipe 11–16 mm long, head 11–17 mm long. Seeds sublenticular, broadly ovate to subsquare, 4.2–5 mm long, 3.6–4.1 mm wide, surfaces with a ± prominent longitudinal central ridge and covered with low rounded tubercles that sometimes coalesce and form a network of irregular ridges, margin with similar tubercles and ± erose at apex and base.

Phenology.— Flowering: December–February; fruiting: January–February.

Habitat.— Pine-oak forests, montane slopes; 1740–2100 m.

Sololá: *Daniel & Barreno 11265* (BIGU, BR, CAS, F, K, MICH, MO, US).

Gibson (1972) described this taxon as a variety of *J. macrantha* based on a single collection from southwestern Guatemala. She noted that it differed from the nominate variety by its pubescence, shorter and broader leaves, shorter inflorescences, and lanceolate and acute calyx lobes. I agree with her that the plant appears different from typical *J. macrantha* in most of these (and other characters), and that its flowers superficially resemble those of that species. Based on the number and types of known differences, however, I propose this taxon as a distinct species of *Justicia* that appears to be endemic to Guatemala, honors the collector of the type, and can be distinguished from *J. macrantha* by the characteristics in the following couplet:

1. Young stems pubescent with eglandular trichomes; inflorescence of dichasiate spikes to 20 mm long; dichasia sessile; calyx 5–6 mm long during anthesis, lobes 4.2–4.8 mm long; corolla red tinged with orange and yellow at mouth, externally pubescent distally with eglandular trichomes . . . . *J. williamsii*

1. Young stems glabrous; inflorescence of dichasiate thyrses or panicles to 60 mm long; dichasia pedunculate, peduncles 3–15 mm long; calyx 4–5 mm long during anthesis, lobes 3.2–3.8 mm long; corolla orange (often with some pink as well), externally glabrous . . . . . *J. macrantha*

Descriptions of the previously unknown capsules and seeds are provided here for the first time. As in many taxa of Acanthaceae, the inflorescence is sometimes modified. In some instances, what superficially appears as an axillary spike is an axillary branch with reduced leaves bearing spikes in their axils. In such cases, the axillary inflorescence might be interpreted as a subleafy panicle of spikes in the leaf axils of the main shoots.

Daniel & Barreno 11265, *Barreno 810* (BIGU), and *Barreno 832* (BIGU) were collected in 2009 near the type locality nearly fifty years after the only previous collection of the species by Williams et al. In 2009 ca. 15 plants were evident in a limited region between one and three kilometers west and upslope from Panajachel toward Sololá. The species appears to be restricted in its range, but persisting on steep slopes. It is not known whether its range overlaps with any of the protected areas in the vicinity of Lago de Atitlán. Although its conservation status remains unknown, this species would appear to be both rare and possibly at risk from local agricultural and highway maintenance activities.

***Lepidagathis alopecuroidea* (Vahl) R.Br. ex Griseb.**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: January–April; fruiting: March–April.

Habitats.— Lowland rain forests, montane forests, wet and wooded ravines, wet pastures, along streams, moist thickets, disturbed sites (e.g., agricultural fields); 100–1400 m.

Alta Verapaz: *Steyermark 44159* (F). **Izabal**: *Daniel et al. 11243* (BIGU, CAS, MO). **Petén**: *Contreras 2156* (LL).

Gibson (1974) treated this species as *Teliostachya alopecuroidea* (Vahl) Nees, a nomenclatural synonym (Daniel 1995b).

Lepidagathis guatemalensis **(Donn. Sm.) Kameyama**

Recent Description.— Acosta C. and Saynes V. (2006).

Phenology.— Flowering: January–March; fruiting: February–March.

Habitats.— Wooded ravines, moist thickets, dry thickets; 720–1300 m.

Escuintla: *Standley 89504* (F, US). **Guatemala**: *Kellerman 6728* (F, US). **Santa Rosa:** *Heyde & Lux 4382* (holotype of *Lophostachys guatemalensis* Donn. Sm.: US; isotypes: A, CAS, GH, K, M, MO, US).

This species was treated by Gibson (1974) and others as *Lophystachys guatemalensis*. Under the latter name, it was illustrated in Gibson (1974). Kameyama (2008) discussed the inclusion of *Lophostachys* in *Lepidagathis*. The species also occurs in El Salvador, and was recently reported from southern Mexico (Acosta C. and Saynes V. 2006).

Louteridium donnell-smithii **S. Wats.**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: December–April; fruiting: December–May.

Habitats.— Lowland rain forests, wet mixed forests, cloud forests, moist forests, tall forests, second growth forests, ramonales, moist thickets, along streams; 30–1600 m.

Local names.— "Oxox ce'" (*Williams & Wilson 40437*; Quecchí name); "tabaco silvestre" (*Contreras 5510*); "vejiga" (*Standley 91236*).

Alta Verapaz: *von Tuerckheim 856* (holotype: US; isotypes: GH, NY, US); *Williams et al. 40323* (F). **Baja Verapaz**: *Williams et al. 43563* (F, MICH). **El Progreso**: *Steyermark 43768* (F, MICH, US). **Huehuetenango**: *Steyermark 49180* (F, US). **Izabal**: *Gregory 612* (CAS, F, US). **Petén**: *Daniel & Véliz 11255* (BIGU, CAS, K, MICH, MO). **Zacapa**: *Steyermark 42400* (F, US).

Gibson (1974) and Daniel (1995b) both noted variation in the color of corollas of this species. Three recent collections from Alta Verapaz exemplify this variation: *Daniel & Véliz 11337* (BIGU, CAS, K, MO) from lowland moist forest (670 m) had creamy yellow (sometimes with maroon veins) corollas that appeared to be primarily nocturnal (i.e., they were falling in the early morning); *Daniel et al. 11356* (BIGU, CAS, K, MO) from cloud forest (1350 m) had dirunal (i.e., not falling by 13:00 hours) and maroon-chestnut corollas that were observed to be visited by hummingbirds; and *Daniel et al. 11335* was cultivated in Cobán (1230 m) and had greenish brown corollas that were nocturnal (i.e., collected with fresh flowers after dark).

Louteridium purpusii **Brandegee**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: October–March; fruiting: January–March.

Habitats.— Moist forests, wet and wooded ravines, along streams; 1300–2000 m.

Quezaltenango: *Standley 86726* (F). **San Marcos**: *Steyermark 37501* (F).

Louteridium mexicanum (Baill.) Standl., which name was used by Gibson (1974) and Parker (2008) for this species in Guatemala, is not known from the country, but it occurs in several states of southern Mexico (Daniel 1995b). *Louteridium chartaceum* Leonard, which was included in the *Flora of Guatemala* by Gibson (1974) from Belize, remains known only from the latter country.

Mendoncia guatemalensis **Standl. & Steyerm.**

RECENT DESCRIPTION.— Daniel (1992).

PHENOLOGY.— Flowering: unknown; fruiting: July.

HABITAT.— Dense forests; 150–200 m.

LOCAL NAME.— "Ciruela de paso sylvestre" (*Steyermark 49270*).

Huehuetenango: *Steyermark 49270* (holotype: F; isotype: NY).

This species is rarely collected in Guatemala (the type is from the Sierra de los Cuchumatanes), but is now also known by numerous collections from Mexico and Honduras (Daniel 1992, 2005).

Mendoncia lindavii **Rusby, Mem. Torrey Bot. Club 4:241. 1895**. TYPE.— BOLIVIA. **Cochabamba**: Yungas, 1890, *M. Bang 532* (lectotype, designated here, see discussion below: NY, photo!; isolectotypes: BM, US!).

Mendoncia belizensis Standl., Field Mus. Nat. Hist., Bot. Ser. 11:142. 1932. TYPE.— BELIZE. **Stann Creek**: 19 Mile Stann Creek Valley, 500 ft. alt., mountain side in dense forest shade, 16 Jun 1932, *W. Schipp 961* (holotype: F!; isotypes: MICH! MO!).

Perennial vines. Young stems ± quadrate, densely and evenly pubescent with light brown to golden antrorse to antrorsely appressed or distally pointed eglandular trichomes 1.5–3.5 mm long. Leaves petiolate, petioles to 14 mm long, blades ovate-elliptic to elliptic, 59–120 mm long, 18–50 mm wide, 2–2.9 times longer than wide, acuminate at apex, rounded to acute at base, surfaces pubescent with antrorse eglandular trichomes. Dichasia alternate or opposite in axils of leaves, 1–2 (–4) per axil, 1-flowered, pedunculate, peduncles to 45 mm long, pubescent with spreading-flexuose eglandular trichomes 2–4.5 mm long (hirsute). Bracteoles ovate-lanceolate, 25–40 mm long, 7.5–11 mm wide, 3.3–4.4 times longer than wide, widest near base, sometimes slightly curved, rounded at base, acute-apiculate at apex, apiculum 1–3 mm long (obscured by pubescence), abaxial surface and margin hirsute. Calyx a ± rigid entire ± flaring annular or cupular ring surrounding nectar disc, 0.5–2.5 mm high. Corolla red, 44–54 mm long, externally glabrous, tube 42–44 mm long, narrow proximal portion 20–25 mm long, ± abruptly expanded into throat, throat 17–22 mm long, 5–6.7 mm in diameter, limb (8–) 10–13.5 mm in diameter, upper lip 5.5–6 mm long, lobes 4.8–5 mm long, 3.5–4 mm wide, lower lip 5–7.5 mm long, lobes 4.5–7.5 mm long, 3–4.3 mm wide. Stamens 10–12 mm long, thecae 9–10 mm long, with an apical projection (sometimes recurved) 0.5–0.7 mm long and a basal cluster of papilla like trichomes 0.1–0.2 mm long; pollen 5-brevicolpate. Style 22–32 mm long, glabrous, stigma ± equally 2-lobed, lobes 0.2–0.4 mm long. Drupe blackish, ellipsoid, 18–22 mm long, 9–13 mm in diameter, surface minutely glandular-punctate and pubescent with erect to flexuose eglandular trichomes 0.1–0.4 mm long.

PHENOLOGY.— Flowering: April–May; fruiting: April–July.

HABITATS.— Wet forests, mesophytic forests with elements of tall forests; 20–750 m.

Alta Verapaz: *Martínez S. et al. 22948* (CAS, HAJB, MO). **Izabal**: *Standley 72603* (F).

Three Bolivian collections were cited by Rusby (1895) in the protologue: *Bang 532* (see above); La Paz: Tipuani-Guanai, Dec 1892, *M. Bang 1707* (BM, MO, NY, US!); and La Paz: Mapiri, *Rusby 2405* (BM, NY, US!). Although the herbaria of deposit were not noted for any of these, various herbaria in which they are located were cited by Wasshausen and Wood (2004). Wasshausen and Wood (2004) noted that *Bang 532* is the type and that the specimen at NY is the holotype. Because syntypes were cited in the protologue, there cannot be a holotype for this species. Wasshausen and Wood's indication of *Bang 532* at NY as the "holotype" would not constitute lectotypification for this name according to Article 9.21 of the International Code of Botanical Nomenclature (McNeill et al. 2006). However, Leonard's (1951:15) earlier indication of "type collected at Yungas, Bolivia, 1890, by Miguel Bang, No. 532," just might. Leonard (1951) indicated that an "isotype" of this collection was at US and that duplicates of *Bang 1707* at US were paratypes. Although Leonard (1951) did not indicate which specimen (Article 9.2 indicates that a lectotype is a specimen or illustration, and thus not a collection of multiple specimens) he thought was the "holotype," his annotations of one of the two specimens of *Bang 532* at NY as the "type" in 1926 and as the "holotype" in 1961, in combination with his 1951 publication that indicates the type collection might be considered as fulfilling the requirements of the Code for lectotypification. If they do not, then *Bang 532* at NY (NYBG 00278379, ex Columbia College Herbarium) is herewith designated as lectotype of *Mendoncia lindavii*. As obviously understood by both Leonard (1951) and Wasshausen and Wood (2004), the first set of Bang's specimens used by Rusby (1893) is at Columbia College (now at NY), where he was employed. (Indeed, labels on Bang's specimens note that they were distributed by Britton and Rusby from the herbarium at Colombia College.) Because all three syntypes pertain to *M. lindavii* as understood here, this choice is a logical one for the type. Although the lectotype is a reasonably complete specimen, the isolectotype at NY (NYBG 00423928, ex College of Pharmacy Herbarium) is equally or perhaps even more complete. Illustrations of the species were provided by Gibson (1974) and Wasshausen and Wood (2004). A species described from Belize, *M. belizensis* Standl., has been treated as conspecific with *M. lindavii* (Gibson 1974; Daniel 1997a).

Pollen of *Mendoncia* (Fig. 9) is distinctive among that of Guatemalan Acanthaceae by its five short colpi (Daniel 1998) and interapertural surface ornamentation (finely rugulate, the rugulae microverrucate).

Mendoncia retusa Turrill

RECENT DESCRIPTIONS.— Daniel (1992, 1995b).

PHENOLOGY.— Flowering: August–October; fruiting: October–November.

HABITATS.— Tall perennial forests, short forests, ramonales, corozales; 120–300 m.

Alta Verapaz: *Contreras 7959* (LL, MO, US). **Izabal**: *Martínez S. et al. 23699* (MO, USCG). **Petén**: *Contreras 6256* (F, LL, MO, US). **Sololá**: *Shannon 90* (US).

Odontonema albiflorum Leonard

RECENT DESCRIPTIONS.— Daniel (1995b, 1995c).

PHENOLOGY.— Flowering: throughout the year; fruiting: throughout the year.

HABITATS.— Lower montane rainforest, tall perennial forests, subdeciduous forests, zapotales, thickets, along streams, disturbed sites (e.g., clearings); 0–1600 m.

Alta Verapaz: *von Tuerckheim 7937* (holotype: US; isotype: US). **Baja Verapaz**: *Pittier 152* (US). **Chimaltenango**: *Johnson 1840* (F). **Huehuetenango:** *Cardona & Morales 217* (USCG). **Izabal**: *Steyermark 41648* (F, LL, US). **Petén**: *Tún Ortiz 1436* (DUKE, F, MO). **Quiché**: *Morales & Pérez 4607* (USCG).

Gibson (1974) reported the species from the department of Guatemala, but no collections from there were located during this study.

Odontonema callistachyum (Schlecht. & Cham.) Kuntze

RECENT DESCRIPTIONS.— Daniel (1995b, 1995c), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: January–August; fruiting: April, July.

HATITAT.— Wet forests, cloud forests, tall forests, mixed forests, moist to wet thickets; 170–2000 m.

Alta Verapaz: *von Tuerckheim 740* (holotype of *Thyrsacanthus geminatus* Donn. Sm.: US; isotypes: F, G, GH, K, M, MO, NY, P, UPS, US). **Baja Verapaz**: *Williams et al. 43391* (F). **Huehuetenango**: *Steyermark 49383* (F). **Izabal**: *Contreras 10033* (LL, MO, US). **Petén**: *Contreras 10443* (F, LL, MO, US).

Gibson (1974) treated this species in a very broad sense that encompassed several previously recognized taxa. Baum (1982) and Daniel (1995c) provided characters to distinguish some of these from *O. callistachyum*. The following key can be used to distinguish all Guatemalan *Odontonema*.

1. Corolla red, pinkish, or purplish.
  2. Corolla pinkish or purplish.
    3. Corolla pinkish; cauline trichomes (if present) 0.05–0.2 mm long; inflorescence rachis glabrous or pubescent with inconspicuous trichomes to 0.1 (–0.3) mm long; dichasia borne on peduncles 2–32 mm long; pedicels glabrous . . . . *O. steyermarkii*
    3. Corolla purplish to pinkish; cauline trichomes (if present) 0.2–0.7 mm long; inflorescence rachis densely pubescent with trichomes 0.2–0.6 mm long; dichasia sessile (rarely borne on peduncles to 2 mm long); pedicels pubescent . . . . *O. callistachyum*
  2. Corolla red.
    4. Rachis nearly glabrous or pubescent with antrorse to crinkled-appressed trichomes either disposed in lines or ± evenly disposed; dichasia sessile, often whorled at inflorescence nodes. *O. tubaeforme*
    4. Rachis evenly pubescent with erect to flexuose-antrorse eglandular trichomes; dichasia borne on peduncles to 25 mm long, opposite at inflorescence nodes . . . *O. cuspidatum*
1. Corolla entirely yellow or pale blue to white with purplish markings on lower lip.
  5. Corolla pale blue to white with purplish markings on lower lip; dichasia mostly whorled (opposite proximally) at inflorescence nodes . . . . *O. albiflorum*
  5. Corolla entirely yellow; dichasia opposite at all inflorescence nodes.
    6. Corolla 22–32 mm long, externally glabrous; dichasia pedunculate, 3–many-flowered; pedicels glabrous; thecae 2.6–3.1 mm long; capsule glabrous . . . . *O. glabrum*
    6. Corolla 14–26 mm long, externally puberulent; dichasia sessile, 1(–3)-flowered; pedicels puberulent; thecae 1.3–1.8 mm long; capsule puberulent . . . . . *O. hondurense*

Odontonema cuspidatum (Nees) Kuntze

Recent descriptions.— Daniel (1995b, 1995c), Daniel and Acosta C. (2003).

Phenology.— Flowering: May, October; fruiting: unknown.

Habitat.— Unknown; 800–1500 m.

Local name.— "Hoja de tinta" (*Aguilar 22*).

Guatemala: *Aguilar 22* (F); *Aguilar 165* (F). **Izabal**: *Castillo s.n.* 15-X-2004 (BIGU).

This species was treated by Gibson (1974) as conspecific with *O. callistachyum*. Daniel (1995c, 2005) discussed its distinctions from that species and its distribution in Central America. The species is only tentatively regarded as native to Guatemala. Aguilar's collections in 1938–1939 from "near Finca La Aurora" (*22*) and from an unspecified locale in the Dept. of Guatemala (*165*) could represent one or more cultivated (or naturalized) occurrence(s) rather than native occurrences. Other collections from Guatemala were noted to have been cultivated. Guatemalan plants resemble collections of this species from other countries. In Chiapas plants occur in lowland rain forests, montane rain forests, and cloud forests.

***Odontonema glabrum* Brandegee**

RECENT DESCRIPTIONS.— Daniel (1995b, 1995c).

PHENOLOGY.— Flowering: February–April; fruiting: unknown.

HABITAT.— Wooded ravines; 620–800 m.

Escuintla: *Standley 63875* (holotype of *O. galbanum* Leonard: US; isotype: F). **Retalhuleu:** *Donnell-Smith 2695* (US). **Sacatepéquez:** *Standley 65014* (F, US). **San Marcos:** *Steyermark 52322* (F).

***Odontonema hondurense* (Lindau) D.N. Gibson, Fieldiana, Bot. 34:74. 1972.** *Diateinacanthus hondurensis* Lindau, Bull. Herb. Boissier, ser. 2, 5:369. 1905. TYPE.— HONDURAS. **Atlántida**: along trail near Bolet's Plantation, Puerto Sierra [=Tela, fide A. Molina R., pers. comm.], 20 Jan 1903, *P. Wilson 129* (holotype: NY, image at http://sweetgum.nybg.org/common/imagedisplay.php?irn=76310).

Odontonema paniculiferum Blake, Contr. Gray Herb. 52:104. 1917. TYPE.— BELIZE. **Belize**: near manatee Lagoon, 8 Jan 1906, *M. Peck 278* (holotype: GH! isotypes: F, K).

Perennial herbs to shrubs to 3.6 m tall. Young stems subquadrate to ± flattened, glabrous to sparsely puberulent with erect eglandular trichomes < 0.1 mm long. Leaves petiolate, petioles to 15 mm long, blades elliptic to obovate, 45–180 mm long, 14–85 mm wide, 2–4.3 times longer than wide, acute to acuminate to subapiculate at apex, acute at base, surfaces glabrous, margin entire to ± sinuate. Inflorescence of terminal pedunculate openly branched panicles of dichasiate racemes, peduncles to 45 mm long, puberulent like young stems or with trichomes denser and inconspicuously glandular punctate, inflorescence bracts (subtending branches) linear to lanceolate to subulate to triangular-subulate, 0.9–3 mm long, 0.4–0.8 mm wide, rachis nearly glabrous or puberulent like peduncles (and glandular punctate); dichasia (alternate to) opposite, sessile, 1(–3)-flowered, 1 per axil. Bracts opposite, triangular, 0.3–1 mm long, 0.3–0.5 mm wide, abaxial surface puberulent with erect eglandular trichomes < 0.1 mm long. Bracteoles sometimes inconspicuous, triangular, 0.2–0.7 mm long, 0.1–0.4 mm wide, abaxial surface pubescent like bracts. Flowers heterostylous, pedicellate, pedicels 2–12 mm long, puberulent. Calyx 1.9–3.5 mm long, lobes triangular-lanceolate to lanceolate, 1.2–2.5 mm long, abaxially glabrous to puberulent. Corolla yellow, 14–26 mm long, externally puberulent with erect eglandular and glandular (sometimes sparse) trichomes up to 0.1 mm long, tube 10–18 mm long, proximal portion cylindric to conic for 4–7 mm thence gradually expanded distally toward limb, limb 8.5–15 mm in diameter, upper lip 3.5–8 mm long, 2-lobed, lobes 3–5 mm long, lower lip 3.5–8 mm long, 3-lobed, lobes 3–7 mm long, 2.5–4.8 mm wide. Stamens inserted near or proximal to midpoint of corolla tube, filaments proximally pubescent with eglandular trichomes, thecae 1.3–1.8 mm long, pin stamens included in corolla tube, 4–6.5 mm long, thrum stamens exserted from mouth of corolla, 11–15 mm long; staminodes 0.6–0.7 mm long, pubescent; pollen 3-colporate, 6-pseudocolpate. Style sparsely pubescent proximally with eglandular trichomes, pin styles exserted from mouth of corolla, 13.5–21 mm long, thrum styles included in corolla tube, 8–10 mm long, stigma lobes equal to subequal, 0.1–0.2 mm long. Capsule 16–20.5 mm long, externally puberulent (at least distally) with inconspicuous sessile to stipitate glandular (and sometimes eglandular as well) trichomes < 0.1 mm long, stipe 7–10 mm long, head ellipsoid to obovoid, with a medial constriction, 8–11 mm long. Seeds lenticular, 2.5–4 mm long, 2–3 mm wide, surfaces and margin covered with rounded to conical tubercles.

PHENOLOGY.— Flowering: December–April, September; fruiting: January–April.

HABITATS.— Lowland rain forests, tall perennial forests, short forests, secondary forests, corozales, along streams; 3–165 (–1200) m.

Izabal: *Daniel et al. 11258* (BIGU, CAS, K, MO, US). **Petén**: *Contreras 10532* (F, LL, MO, US).

Differences in relative lengths of the stamens and styles among collections reveal *O. hondurense*, like all other species of *Odontonema* from Guatemala, to be heterostylous (i.e., distylous). Daniel (2005) discussed some of the morphological variation encountered in the species. Label data on *Martínez S. et al. 23669* from Izabal indicates that the plant was a tree to 10 m; if accurate, this habit would be unusual for the genus. Flowers of a collection of *O. hondurense* from Belize (*Shipp 222*) were noted to have been visited by hummingbirds. Gibson (1974) noted the occurrence of this species in Chiquimula, possibly based on *Watson 168* from "eastern portions of Vera Paz and Chiquimula."

Odontonema steyermarkii **Leonard, J. Wash. Acad. Sci. 33:71. 1943**. TYPE.— GUATEMALA. **Quezaltenango**: along road between Finca Pirineos and Calahuaché, 1200–1300 m, 27 Jan 1940, *J. Steyermark 35020* (holotype: F!; isotype: US!).

Shrubs (sometimes clambering) to 3 m tall. Young stems quadrate-sulcate to subquadrate, ± 2-fariously pubescent with flexuose to antrorse eglandular trichomes 0.05–0.2 mm long or ± glabrous. Leaves petiolate, petioles to 15 mm long, blades elliptic, 125–290 mm long, 43–106 mm wide, 2.4–4 times longer than wide, acuminate at apex, attenuate at base, surfaces sparsely pubescent (at least on major veins) with eglandular trichomes or ± glabrous. Inflorescence of terminal usually branched (at least basally) dichasiate thyrses to 6.3 dm long, inflorescence bracts (subtending branches) subfoliose to linear to lance-subulate (e.g., reduced to 5.5 × 1.2 mm), rachis glabrous or with inconspicuous antrorse to distally pointing eglandular trichomes to 0.1 (–0.3) mm long, trichomes (when present) irregularly disposed on some portions of rachis; dichasia opposite, pedunculate, mostly 3–many-flowered, ± expanded (i.e., secondary peduncles usually present), peduncles 2–32 mm long, glabrous. Bracts opposite, lance-subulate to subulate-acicular, 2–5 mm long, 0.4–1.1 mm wide, abaxial surface glabrous to sparsely pubescent with distally pointing eglandular trichomes to 0.2 mm long. Bracteoles subulate to subulate-acicular, 1.6–3 mm long, 0.3–0.7 mm wide, abaxial surface glabrous or pubescent like bracts; secondary bracteoles similar to bracteoles except smaller. Flowers heterostylous, pedicellate, pedicels 2–6 mm long, glabrous. Calyx 2–5 mm long, lobes lance-subulate, 1.9–4 mm long, abaxially glabrous or pubescent like bracts. Corolla pinkish, 21–30 mm long, externally glabrous (margins of lobes often ciliate), tube 15–24 mm long, ± abruptly expanded near midpoint into a throat, narrow proximal portion of tube 8–12 mm long, 1.2–1.9 mm in diameter near midpoint, throat 7–12 mm long (shorter or longer than narrow proximal portion), 3–4.6 mm in diameter near midpoint, upper lip 5–7 mm long, 2-lobed, lobes 1.5–2 mm long, lower lip 4–7.5 mm long, 3-lobed, lobes 4–7 mm long, 1.8–3.5 mm wide. Stamens inserted near base of corolla throat, filaments glabrous, thecae 2–3 mm long, pin stamens included in corolla tube, 7 mm long, thrum stamens exserted from mouth of corolla, 12–14 mm long; staminodes 0.8–1 mm long, glabrous; pollen 3-colporate, 6-pseudocolpate. Style sparsely pubescent with erect eglandular trichomes to 0.1 mm long, pin styles exserted from mouth of corolla, 20–22 mm long, thrum styles included in corolla tube, 14–15 mm long, stigma 0.1–0.2 mm long, ± equally 2-lobed (or lobes barely distinct). Ovary glabrous. Capsule and seeds unknown.

PHENOLOGY.— Flowering: December–April; fruiting: unknown.

HABITATS.— Riparian forests, moist to wet thickets, along streams; 240–1200 m.

LOCAL NAME.— "Palo de agua" (*Standley 88771*).

Escuintla: *Standley 89559* (F, US). **Quezaltenango**: *Skutch 2028* (F, US). **Retalhuleu**: *Standley 88771* (F). **Sacatepéquez**: *Standley 88948* (F). **San Marcos**: *Shannon 346* (US). **Suchitepéquez**: *Standley 88892* (F).

Although *Odontonema steyermarkii* was included, along with several other species, within a greatly expanded concept of *O. callistachyum* by Gibson (1974), this distinctive Guatemalan endemic can be distinguished from others in the country by the combination of its pedunculate and opposite dichasia, glabrous (or inconspicuously pubescent) rachises, and pinkish corollas. Among Guatemalan collections corollas are described as "dirty pink," "dull pink," "pale red," and "salmon-pink." Notes on the type indicate that corollas were pale buff along the tube and lilac on the lobes; in other features, the type conforms to other collections of this species.

Baum (1982) cited *White 5204* (MICH) from Chimaltenango as pertaining to this species. I was unable to locate that collection at MICH, and the species is otherwise unknown from that department.

The species is known by at least 10 collections from six departments and was last collected in 1987 (*Croat & Hannon 63400*). Most collections were made prior to 1960, and the conservation status of the species remains unknown.

***Odontonema tubaeforme* (Bertol.) Kuntze**

RECENT DESCRIPTIONS.— Daniel (1995b, 1995c).

PHENOLOGY.— Flowering: throughout the year; fruiting: December–May.

HABITATS.— Lowland rain forests, montane rain forests, cloud forests, moist forests, tall forests, short forests, dry to wet thickets, ramonales, along streams; 50–2800 m.

LOCAL NAME.— "Coralillo" (*Stricker 357*).

Alta Verapaz: *Standley 91771* (F, US). **Chimaltenango**: *Morales R. 1285* (F). **Escuintla:** *Velasquez s.n.* (holotype of *Justicia tubaeformis* Bertol.: BOLO). **Izabal**: *Daniel et al. 11238* (BIGU, CAS, MO). **Petén**: *Contreras 1018* (F, MO). **Quezaltenango**: *Steyermark 33431* (F). **Retalhuleu**: *Standley 87881* (F). **Sacatepéquez**: *Molina R. 15434* (F). **San Marcos**: *Steyermark 37318* (F). **Santa Rosa**: *Heyde & Lux 4553* (F, US). **Sololá**: *Quedensley 4896* (BIGU). **Suchitepéquez**: *Standley 66935* (F). **Totonicapán**: *Williams et al. 23974* (F, LL, US).

Gibson (1974) included this species within her broad concept of *O. callistachyum*. Several plants annotated by Baum as *O. glaberrimum* (M.E. Jones) V.M. Baum from Petén, Guatemala (e.g., *Contreras 6688* at LL, MO, US, and *Lundell 1646* at LL) pertain to *O. tubaeforme*.

This species shows considerable morphological variation in portions of Central America (e.g., El Salvador, see Daniel 2001). Among plants from Guatemala: bracts along the inflorescence rachis are often, but not always, whorled; pubescence of the rachis varies from nearly glabrous to pubescent in lines with antrorse eglandular trichomes to pubescent with ± evenly disposed trichomes that are crinkled-appressed; and all plants have red corollas (although *Contreras 6688* from Petén is noted to have "pinkish-red" corollas). Thus, plants in Guatemala show variation similar to those in El Salvador, as opposed to the general lack of variation evident among Mexican and Honduran plants.

***Poikilacanthus macranthus* Lindau**

RECENT DESCRIPTIONS.— Daniel (1991b, 1995b).

PHENOLOGY.— Flowering: January–August; fruiting: January–April.

HABITATS.— Lower montane rain forests, moist forests, tall forests, moist thickets, slopes, ravines; 345–1800 m.

LOCAL NAME.— "Sacatillo chiltet" (*Steyermark 33407*).

Alta Verapaz: *Johnson 523* (holotype of *P. setiferus* Standl. & Steyerm.: F; isotype: US). **Baja Verapaz**: *Lundell & Contreras 19596* (LL, MO, US). **Huehuetenango**: *Steyermark 49453* (F, US). **Izabal**: *Daniel et al. 11245* (BIGU, CAS, K, MO, US). **Quezaltenango**: *Standley 68443* (F). **San**

Marcos: *Steyermark 37405* (F, US). **Sololá**: *Emeterio 797* (UVAL). **Suchitepéquez**: *Steyermark 46607* (F, US).

Gibson (1974) treated *Poikilacanthus setiferus* as distinct from *P. macranthus*. Daniel (1995b) treated them as conspecific. A syntype of *P. macranthus* (*Bernoulli & Cario 2301* at B, destroyed) was collected from an unknown department in Guatemala. Typification of this species was discussed by Daniel (1995b). The three species of Guatemalan *Poikilacanthus* can be distinguished by the following key:

1. Bracts pubescent with eglandular trichomes only; corollas pinkish purple, 55–75 mm long, externally pubescent with glandular (and sometimes also with a few eglandular) trichomes . . . . *P. macranthus*
1. Bracts pubescent with glandular and eglandular trichomes; corollas red, 35–42 mm long, externally pubescent with eglandular trichomes only.
    2. Leaves subsessile (petioles to 1 mm long), blades rounded to acute at base; bracts 4–6 mm long, 1.7–2.5 mm wide; calyx 9–12 mm long during anthesis, abaxially glabrous; lobes of lower lip of corolla 1–1.5 mm long; anther thecae 1.5–1.8 mm long, those of a pair oriented perpendicular, superposed (gap 0.2–0.9 mm), lacking basal appendages . . *P. pansamalanus*
    2. Leaves petiolate (petioles to 15 mm long), blades attenuate at base; bracts 7–10 mm long, 2.6–4.2 mm wide; calyx 6.8–8 mm long during anthesis, abaxially pubescent; lobes of lower lip of corolla 2–3 mm long; anther thecae 2–2.9 mm long, those of a pair subparallel, unequally inserted (overlapping by 1.2–1.5 mm), each with an inconspicuous basal appendage to 0.2 mm long . . . . *P. skutchii*

***Poikilacanthus pansamalanus* (Donn. Sm.) D.N. Gibson, Fieldiana, Bot. 34:75. 1972.** *Beloperone pansamalana* Donn. Sm., Bot. Gaz. (Crawfordsville) 13:75. 1888. Type.— GUATEMALA. **Alta Verapaz**: Pansamalá, 3800 ft., Oct. 1885 *H. von Tuerckheim 732* (holotype: US!; isotype: GH). Although two dates ("Oct., 1885, Sept., 1886") are noted in the protologue, the label of the presumed holotype at US states only the date in October 1885. It is possible that another gathering attributed to *von Tuerckheim 732* was made in September 1886 (and perhaps even labeled so), but because the presumed holotype cites only a single date, this name would appear to be validly published.

Perennials. Young stems quadrate to quadrate-sulcate, 2-fariously pubescent with flexuose to antrorse eglandular trichomes 0.1–0.3 mm long, trichomes conspicuously multi-celled with maroon septae. Leaves subsessile (petioles to 1 mm long), pair at a node either anisophyllous or ± isophyllous (at least some pairs anisophyllous on branches), blades ± coriaceous, elliptic, 7.5–30 mm long, 4.5–14 mm wide, 1.6–2.3 times longer than wide, rounded to acute at base, acute to subacuminate at apex, adaxial surface glabrous, abaxial surface sparsely pubescent along midvein with eglandular trichomes, margin entire. Inflorescence of terminal spikelike axes bearing 1–3 dichasia; dichasia 1 per axil of distal leaf or bract, sessile, 1-flowered. Bracts spatulate to cuneate to deltate, 4–6 mm long, 1.7–2.5 mm wide, abaxial surface and margin distally pubescent with erect to flexuose mostly glandular trichomes 0.1–0.2 mm long. Bracteoles spatulate to cuneate to deltate, 6–7 mm long, 1.5–2 mm wide, abaxial surface and margin pubescent like bracts. Flowers sessile. Calyx 9–12 mm long, lobes lanceolate, 8–10.5 mm long, 1–1.2 mm wide, abaxially glabrous, margin ciliate with flexuose to antrorse eglandular trichomes to 0.5 mm long. Corolla red, 37–39 mm long, externally pubescent with flexuose eglandular trichomes 0.1–0.5 mm long, tube 22–25 mm long, gradually expanded distally, 2.7–3 mm in diameter near midpoint, upper lip rugulate, 13–15 mm long, 2-fid at apex, lower lip 13–15 mm long, lobes 1–1.5 mm long, 1.5–2 mm wide. Stamens inserted near apex of corolla tube, 14 mm long, filaments glabrous distally, thecae 1.5–1.8 mm long, equal to subequal in length, perpendicular, superposed (gap 0.2–0.9 mm), glabrous, lacking basal appendages; pollen 5 or 6[?]-porate, insulae discrete or contiguous (but not sharing common walls). Style 33 mm long. Capsule unknown.

PHENOLOGY.— Flowering: April, Ocotber; fruiting: unknown.

HABITATS.— Forests; ca. 1150 m.

Alta Verapaz: *Donnell-Smith 1683* (US).

This species is endemic to Guatemala (Alta Verapaz) and is apparently known only from the two late nineteenth century collections (both from Pansamalá) noted above. Attempts to relocate this species in a remnant cloud forest in the region of Pansamalá in January 2010 were not successful, and it remains unknown whether the species still persists.

Poikilacanthus skutchii **D.N. Gibson, Fieldiana, Bot. 34:75. 1972.** TYPE.— GUATEMALA. **Quezaltenango**: Volcán Zunil, 2400 m, 4 Aug 1934, *A. Skutch 936* (holotype: F!; isotypes: A, US!).

Shrubs to 2 m tall. Young stems quadrate-sulcate to ± flattened, 2-fariously (to ± evenly) pubescent with flexuose to retrorse eglandular trichomes 0.2–0.3 mm long, trichomes conspicuously multi-celled with dark bands. Leaves petiolate (petioles to 15 mm long), pair at a node either anisophyllous or ± isophyllous (at least some pairs anisophyllous on branches), blades ± membranaceous, elliptic to obovate, 21–81 mm long, 11–50 mm wide, 1.9–3.9 times longer than wide, attenuate at base, acute to abruptly acuminate at apex, surfaces pubescent along major veins only, margin entire. Inflorescence of terminal pedunculate dichasiate spikes to 38–46 mm long (including peduncle and excluding flowers); peduncles to 9 mm long, pubescent with eglandular (and usually glandular as well) trichomes; rachis ± evenly pubescent with flexuose to retrorse glandular and eglandular trichomes 0.1–0.3 mm long; dichasia opposite (or sometimes occurring in only one axil at proximalmost node), sessile, 1-flowered. Bracts opposite, obovate-spatulate to obovate to deltate, 7–10 mm long, 2.6–4.2 mm wide (proximalmost pair sometimes larger and subfoliose), abaxial surface and margin pubescent with erect to flexuose glandular (and a few eglandular) trichomes 0.1–0.3 mm long. Bracteoles linear-elliptic to oblanceolate to spatulate, 5–10 mm long, 1.6–2.6 mm wide, abaxially and marginally pubescent like bracts. Flowers sessile. Calyx 6.8–8 (–9 in fruit) mm long, lobes lance-linear, 6–6.5 (–8) mm long, 0.9–1.3 (–1.5) mm wide, abaxially sparsely pubescent like bracts, margin sparesly ciliate (primarily toward apex) with antrorse to flexuouse eglandular trichomes to 0.2 mm long. Corolla red, 35–42 mm long, externally pubescent with erect to flexuose eglandular trichomes 0.1–0.5 mm long, tube 20–24 mm long, ± gradually expanded distally, 2–3.7 mm in diameter near midpoint, upper lip rugulate, 13–20 mm long, 2-fid at apex, lower lip 13–19 mm long, lobes 2–3 mm long, 1.8–3 mm wide. Stamens inserted near apex of corolla tube, 19–22 mm long, filaments glabrous distally, thecae 2–2.9 mm long, ± equal in length, subparallel, unequally inserted (overlapping by 1.2–1.5 mm), glabrous, each with an inconspicuous basal appendage to 0.2 mm long; pollen 6-porate, insulae discrete or contiguous (sharing common walls or not). Style 33–40 m long, glabrous, stigma equally 2-lobed, lobes 0.2–0.4 mm long. Capsule 13–14.5 mm long, sparsely pubescent with erect to flexuose eglandular trichomes 0.1–0.2 mm long, stipe 5–6.5 mm long, head ellipsoid to obovoid, 8–8.5 mm long. Seeds 4, discoid, 3 mm long, 3 mm wide, minutely papillate, lacking trichomes.

PHENOLOGY.— Flowering: March, August–December; fruiting: December–January.

HABITATS.— Wet montane forests, cloud forests, wooded slopes, along streams; 2100–2425 m.

Quezaltenango: *Skutch 936* (type, see above). **San Marcos**: *Breedlove & Almeda 64860* (CAS, K, MO, US).

This species (Fig. 12) is endemic to Guatemala (Quezaltenango, San Marcos) and is known by the type from Quezaltenango and by five collections from San Marcos. The type was noted to be a principal ground cover around 8000 feet under heavy forest on Volcán Zunil (fide a letter from the collector of the type, A. Skutch, to D. Gibson that is attached to the holotype). Skutch approached Volcán Zunil from Santa María de Jesús. In San Marcos, the species occurs on montane slopes between San Marcos and San Rafael Pie de la Cuesta, where it was last collected in 2010 (*Daniel et al. 11323* at BIGU, CAS, K, MO, US). It appears to be uncommon but locally frequent in this region; more than 40 plants were observed in 2010 on the moist forested slopes above

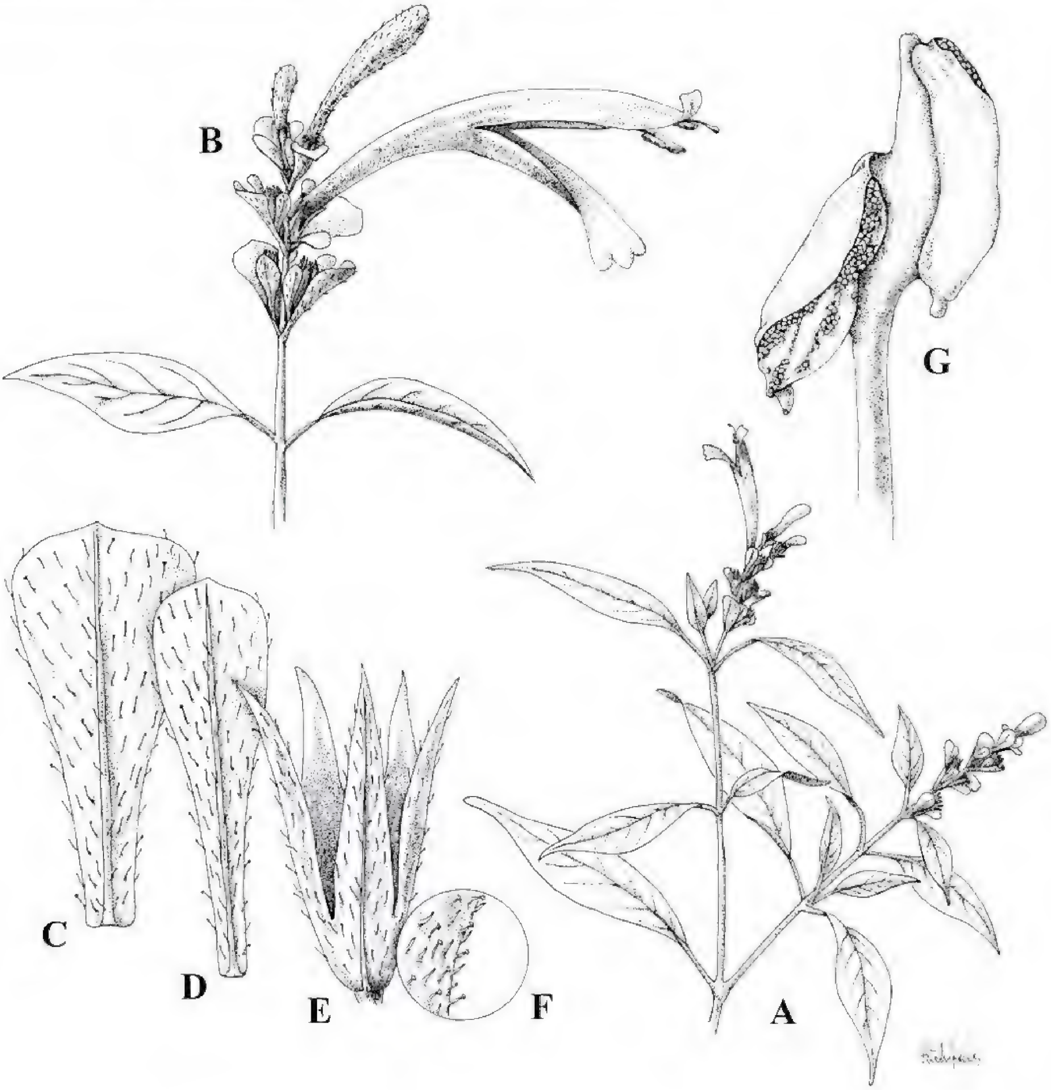


FIGURE 12. *Poikilacanthus skutchii* (*Breedlove & Almeda 64860*). A. Habit, × 0.5. B. Inflorescence with flower, × 1.3. C. Bract, × 7. D. Bracteole, × 7. E. Calyx, × 6. F. Trichomes on external surface of calyx, × 10. Anther, × 15. Drawn by A. Whitesides.

and along a 50 meter stretch of a stream crossing a highway. Although the species is still extant and locally frequent, its overall conservation status remains unknown.

***Pseuderanthemum alatum* (Nees) Radkl.**

RECENT DESCRIPTIONS.— Daniel (1995b), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: March, June–December; fruiting: October–March.

HABITATS.— Tall forests, moist secondary forests, ramonales; 150–350 m.

Petén: *Contreras 3744* (F, K, LL, MO, US).

Pseuderanthemum alatum is uncommonly collected in Guatemala, but is widespread in Mexico and other regions of Central America, where it is sometimes abundant. Gibson (1974) noted an apparent close relationship between this species and *P. cuspidatum*. Indeed, several collections (e.g., *Lundell 16059* from Petén) show some intermediacy in the diagnostic characters (e.g., calyx length and base of the leaf blade) used to distinguish them. In Guatemala, these two species appear to occur at different elevations.

***Pseuderanthemum cuspidatum* (Nees) Radkl.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: July–November; fruiting: February–March, September–November.

HABITATS.— Wet forests, moist broadleaf forests, dry forests, swamps, wet ravines, streamside slopes; 670–1800 m.

Alta Verapaz: *Standley 69972* (F). **Baja Verapaz**: *Croat 41356* (CAS, MO). **El Progreso**: *Ramirez 205* (BIGU). **Huehuetenango**: *Castillo & Castillo 2649* (F, MO, US).

Buceragenia glandulosa Leonard was recognized by Gibson (1974). Plants conforming to the type of this name were treated as cleistogamous-flowered individuals of *P. cuspidatum* by Daniel (1995b). Information on *Steyermark 51141* from Huehuetenango indicates that the leaves were silvery green abaxially with rose-colored nerves. Gibson (1974) noted the occurrence of the species in the department of Guatemala, but no specimens from there were located during this study.

***Pseuderanthemum praecox* (Benth.) Leonard**

RECENT DESCRIPTIONS.— Daniel (1995b, 1999a, 2004b), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: January–June; fruiting: March–April.

HABITATS.— Broadleaf forests, pine-oak forests, pine forests, moist slopes in shrubby pastures; 1500–1980 m.

Alta Verapaz: *von Türckheim 1199* (GH, US). **Baja Verapaz**: *Pittier 151* (US). **Chimaltenango**: *Standley 64391* (F). **Chiquimula**: *Dávila & Cóbar 1505* (BIGU). **El Progreso**: *Sharp 45266* (F, GH, NY). **Guatemala**: *Emeterio s.n.* 21 III 1993 (UVAL). **Quetzaltenango**: *Equipo CECON 1065* (BIGU, MO). **Quiché**: *Heyde & Lux 3116* (GH, K, NY, US). **San Marcos**: *Steyermark 37275* (F). **Santa Rosa**: *Heyde & Lux 4560* (GH, K, US). **Zacapa**: *Steyermark 43211* (F).

As interpreted here, this species is a heterogenous assemblage of plants that share the following characteristics: low herbs (less than 5 dm tall), homostylous flowers, conspicuous calyces (4–10 mm long), and glabrous capsules. It includes plants previously treated by Daniel (2001) as *P. fasciculatum* (Oerst.) Leonard in El Salvador. Daniel (2004b) discussed some of the morphological diversity and its seasonal basis among plants of this species from the northern portion of its distribution in Sonora, Mexico. Gibson (1974) noted the occurrence of the species in Huehuetenango, but no collections from that department were located during this study.

Pseuderanthemum verapazense **Donn. Sm.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: March–April, December; fruiting: March, December.

HABITATS.— Tall forests, short forests, thickets, zapotales; 50–250 m.

Alta Verapaz: *von Tuerckheim 8258* (holotype: US; syntype of *P. adenocalyx* Lindau: presumably B, destroyed). **Izabal**: *Steyermark 39167* (F). **Petén**: *Lundell & Contreras 20668* (F, K, LL, MO, US).

Gibson (1974) noted the occurrence of *P. verapazense* in Chiquimula, likely based on Watson collections (e.g., *198a, 271b*) from "eastern portions of Vera Paz and Chiquimula," which she annotated with this name.

Razisea spicata **Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1854:142. 1855.** TYPE.— COSTA RICA. **Alajuela**: Bjerget Aguacate [Cerro de Aguacate], 2000 ft., Nov, *A. Oersted 10710* (holotype: C!).

Kolobochilus leiorhachis Lindau, Anales Inst. Fis.-Geogr. Nac. Costa Rica 9:188. 1898. TYPE.— COSTA RICA. Nine syntypes representing collections of Warscewicz, Pittier, Tonduz, and Biolley from diverse regions of Costa Rica were cited.

Perennial herbs or shrubs to 4 m tall. Young stems subquadrate to ridge-angled to ± flattened, ± evenly to ± bifariously pubescent with flexuose to retrorse to antrorsely appressed eglandular trichomes 0.1–0.4 mm long or nearly glabrous. Leaves petiolate, petioles to 70 mm long, blades elliptic, 115–430 mm long, 48–210 wide, 2.0–4.0 times longer than wide, acuminate at apex, attenuate at base, surfaces pubescent with mostly antrorsely appressed eglandular trichomes (concentrated along or restricted to veins), margin subcrenate to crenate, eciliate or ciliate. Inflorescence of terminal pedunculate racemes (or thyrses) to 460 mm long, rachis glabrous or evenly to ± bifariously pubescent with flexuose to retrorse to antrorse eglandular trichomes 0.1–1 mm long, dichasia opposite to subopposite, sessile (to pedunculate), 1–many-flowered, peduncles (if present) to 4 mm long. Bracts (triangular to) lance-subulate to lanceolate to ovate, 1–11 mm long, 0.7–2.2 mm wide, abaxial surface glabrous or pubescent along midvein with antrorse eglandular trichomes. Bracteoles (triangular to) lance-subulate to ovate, 0.7–7 mm long, 0.3–1.8 mm wide, abaxial surface glabrous or pubescent like bracts, secondary bracteoles similar to bracteoles except smaller. Flowers pedicellate, pedicels (1–) 6–20 mm long, glabrous or pubescent with erect to flexuose to antrorse eglandular trichomes 0.05–0.1 mm long. Calyx 4–13 mm long during anthesis (up to 15 mm long in fruit), abaxially glabrous, lobes lanceolate to linear-lanceolate, 3–14 mm long, subequal to unequal in length, 0.8–1.5 mm wide, margins eciliate or ciliate. Corolla red, ± truncate with a slight beak in bud, 44–64 mm long, externally glabrous proximally and pubescent distally (i.e., near lips and mouth) with antrorse to antrorsely appressed eglandular trichomes (sometimes very sparse or absent) 0.05–0.1 mm long or rarely pubescent over entire surface with erect to flexuose to antrorse eglandular trichomes 0.05–0.2 mm long, margins of lips ciliate with flexuose eglandular trichomes to 0.1 mm long, tube 35–55 mm long, narrow proximal portion 9–17 mm long, ± gradually expanded into throat, throat 27–43 mm long, 4.5–9 mm in diameter near midpoint, upper lip 6.5–14 mm long, lower lip ± truncate, 2.5–8 mm long, lobes 1–1.3 mm long, 0.7–1.2 mm wide. Stamens inserted near base of throat, 42–60 mm long, thecae red, 2.5–4.6 mm long. Style red, 58–78 mm long, stigma 0.2–0.4 mm long. Capsule 16–21 mm long, glabrous, stipe 9–12 mm long (usually longer than head), head 8–9 mm long. Seeds lenticular, 3–4 mm long, 2.6–3.4 mm wide, immature surfaces tuberculate-ridged, mature surfaces rugose to tuberculate-ridged (at least around margin, central portions often ± smooth).

Phenology.— Flowering: December; fruiting: unknown.

Habitat.— "Uppermost ridges and summit of Cerro San Gil; "1200–1300" m.

Izabal: *Steyermark 41979* (F).

The sole known Guatemalan collection represents the northernmost occurrence for this species, which is frequently encountered in wet montane forests of southern Central America. Plants were collected on the uppermost ridges and summit of Cerro San Gil at 1200–1300 m elevation on 26–27 December 1941. The species has not been collected in Guatemala since that time. Gibson (1974) provided an illustration of *R. spicata*. Because of significant morphological variation in this widely distributed species (Guatemala to Colombia), a comprehensive description is provided above. Throughout its geographic range, considerable variation is evident in pubescence of the rachis, number of flowers per dichasium, pedicel length, pubescence of the corolla, bract/bracteole length, and calyx length. Guatemalan plants are perennial herbs to 1.2 m tall with: young stems glabrous; dichasia sessile, opposite, and 1-flowered; flower pedicels 2.5–3 mm long; bracts 4–6 mm long and bracteoles 3 mm long; calyces 8–11 mm long; corolla buds 30 mm long; and anther thecae 4–4.2 mm long.

Ruellia blechum L.

Recent descriptions.— Daniel (1995b, 1999a; as *Blechum pyramidatum*) and Daniel and Acosta (2003; as *B. pyramidatum*).

Phenology.— Flowering: throughout the year; fruiting: throughout the year.

Habitats.— Lowland moist evergreen forests, moist to wet forests, short forests, tropical deciduous forests, acahuales, ramonales, moist to wet thickets, pastures, along streams, disturbed sites (e.g., clearings, pastures, roadsides); 0–1300 m.

Local name.— "Corrimiento" (*Lundell 2170*).

Alta Verapaz: *Steyermark 44234* (F). **Baja Verapaz**: *Daniel & Véliz 11328* (BIGU, CAS). **El Progreso**: *Salazar 81* (BIGU, MO). **Escuintla**: *Standley 60146* (F). **Guatemala**: *Croat & Hannon 63568* (CAS). **Huehuetenango**: *DASA 4851* (USCG). **Izabal**: *Steyermark 42046* (F). **Petén**: *Lundell 16875* (F). **Quezaltenango**: *Steyermark 34500* (F). **Retalhuleu**: *Standley 66531* (F). **San Marcos**: *Daniel et al. 11320* (BIUG, CAS). **Santa Rosa**: *Standley 78037* (F). **Suchitepéquez**: *Standley 62212* (F, US). **Zacapa**: *Daniel et al. 11221* (BIGU, CAS).

The species has long been known as either *Blechum brownei* Juss (e.g., Gibson 1974) or *B. pyramidatum* (Lam.) Urb. (e.g., Daniel 1995b), which names are taxonomic synonyms. Molecular phylogenetic studies (Tripp et al. 2009) reveal *Blechum* to be monophyletic, but nested among *Ruellia*. Thus, recognition of the former genus renders the latter one paraphyletic.

Ruellia donnell-smithii Leonard

Recent Description.— Daniel (1995b).

Phenology.— Flowering: February–March; fruiting: February–March.

Habitats.— Dry to wet thickets, weedy fields; 120–900 m.

Escuintla: *Donnell Smith 2015* (holotype: US; isotypes: GH, K, US). **Retalhuleu**: *Standley 88583* (F).

Ruellia geminiflora Kunth

Recent Description.— Daniel (1995b).

Phenology.— Flowering: December–June; fruiting: October–June.

Habitats.— Oak forests, pine forests, dry and brushy slopes, disturbed sites (e.g., roadsides, clearings); 150–1100 m.

Alta Verapaz: *Steyermark 44043* (F, US). **Baja Verapaz**: *Kellerman 8041* (F). **Guatemala**: *Standley 80464* (F). **Izabal**: *Standley 72267* (F). **Petén**: *Lundell 3485* (F, MICH, US).

A fruiting collection from the department of Guatemala (near Finca La Aurora, 1500 m, 1938–1939 (frt), *Aguilar 334* at F, "maravilla de monte") was originally identified as this species and it appears superficially similar to it. It differs by having bracteoles and having very few glandular punctae on the calyx and capsules. Its capsules rupture on dehiscence much like those of *R. erythropus* (Nees) Lindau and species previously treated in *Blechum*. This type of dehiscence, with the base of the placenta and retinacula separating from the inner wall of the mature capsule and ± rising elastically, is sometimes present among specimens of *R. geminiflora*. The identify of *Aguilar 334* must await additional studies.

***Ruellia harveyana* Stapf**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: April–July, October; fruiting: April–July, October.

Habitats.— Tall perennial forests, corozales, thickets, brushy slopes, disturbed sites (e.g., coffee plantations); 80–550 m.

Local name.— "Violeta" (*Pittier 8582*).

Alta Verapaz: *Martínez S. et al. 22692* (CAS, MO, USCG). **Izabal**: *Lundell & Contreras 19319* (F, LL).

Gibson (1974) also recognized *R. obtusata* Blake, which was treated as conspecific with *R. harveyana* by Daniel (1995b). Leaf margins among Guatemalan plants vary from entire (*Pittier 8582* at US) to conspicuously sinuate-crenate (e.g., *Lewton 374* at US).

***Ruellia hookeriana* (Nees) Hemsl.**

Recent descriptions.— Daniel (1995b), Daniel and Acosta C. (2003).

Phenology.— Flowering: June–December; fruiting: September–November.

Habitats.— Pine forests, pine-grass ridges, brushy slopes, disturbed sites (e.g., roadsides); 800–1500 m.

Local name.— "Hierba de torro" (*Molina R. & Molina 26787*, *Steyermark 51093*).

Local uses.— "Reputed to be used for when cattle cannot procreate; feed the cattle this plant and they are believed to be able to procreate afterward" (*Steyermark 51093*).

Baja Verapaz: *Tenorio L. et al. 14780* (CAS, USCG). **Chiquimula**: *Molina R. & Molina 26787* (F, MICH). **Guatemala**: *Croat 41901* (MO). **Huehuetenango**: *Steyermark 51476* (F, US). **Jalapa**: *Steyermark 33006* (F). **Jutiapa**: *Standley 75835* (F). **Petén**: *Contreras 2350* (LL). **Santa Rosa**: *Heyde & Lux 3112* (US, MO). **Zacapa**: *Steyermark 29512* (F).

***Ruellia inundata* Kunth**

Recent descriptions.— Daniel (1995b, 1997b, 1999a).

Phenology.— Flowering: October–March; fruiting: November–March.

Habitats.— Broad-leaved forests, tropical deciduous forests, thornscrub, moist to dry thickets, along streams, disturbed sites (e.g., roadsides); 120–1255 m.

Baja Verapaz: *Lewis s.n.* (F). **Chimaltenango**: *Johnston 1146* (F). **Chiquimula**: *Molina R. & Molina 25147* (F, US). **El Progreso**: *Molina R. & Molina 24937* (F, MO). **Guatemala**: *Standley 89420* (F). **Huehuetenango**: *Williams et al. 41378* (F). **Jutiapa**: *Standley 75979* (F, US). **Quiché**: *Standley 62499* (F). **Retalhuleu**: *Standley 87534* (F, US). **Santa Rosa**: *Standley 79205* (F). **Zacapa**: *Williams et al. 41864* (F).

Some Guatemalan plants have rose-pink corollas (*Molina R. & Molina 25147*) whereas others have blue-purple corollas (e.g., *Croat & Hannon 63545* at MO, US). Gibson (1974) noted the occurrence of this species in Alta Verapaz. The only collection possibly from that department seen during this study is *von Tuerckheim II 1113 (8727)* at US. The original printed label indicates Cubilguitz in Alta Verapaz, but this locale has been crossed out and Amatitlán written in. Later printed labels say "Amatitlán, Depart. Amatitlán." This locale is in the department of Guatemala.

***Ruellia jussieuoides* Schlecht.**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: January–March; fruiting: January–April.

Habitats.— Wet montane forests, stream banks, lake margins; 100–580 m.

Alta Verapaz: *Daniel & Véliz 11339* (BIGU, CAS, K, MO). **Petén**: *Steyermark 45877* (F, US).

***Ruellia lactea* Cav.**

Recent descriptions.— Daniel (1995b, 1999a), Daniel and Acosta C. (2003).

Phenology.— Flowering: July; fruiting: unknown.

Habitat.— Unknown; 2000 m.

Huehuetenango: *Steyermark 48216* (F). **Quiché**: *Heyde & Lux 3115* (US).

Gibson (1974) treated this species as *R. abbreviata* D.N. Gibson, which was considered to be conspecific with *R. lactea* by Daniel (1995b). Both collections cited above conform to the subcaulescent form of this species that has also been treated as *R. lactea* var. *acaulis* (Nees) Hemsl. Guatemalan plants often lack most or all of the glandular trichomes on the calyx and corolla prevalent among some Mexican plants. In Chiapas, Mexico, both caulescent and subcaulescent forms of the species occur in pine-oak forests.

***Ruellia latibracteata* D.N. Gibson**

Recent Description.— Daniel (1995b; as *Blechum grandiflorum*).

Phenology.— Flowering: February–April; fruiting: February–April.

Habitats.— Riparian forests, moist thickets, disturbed sites (e.g., roadsides); 600–1700 m.

Alta Verapaz: *Standley 91805* (F, US). **Baja Verapaz**: *von Tuerckheim II 1753* (US). **Chiquimula**: *Véliz et al. 15115* (BIGU).

This species has usually been treated as *Blechum grandiflorum* Oerst. Because *Blechum* is now treated in *Ruellia* (see above under *Ruellia blechum*), Gibson's name becomes the first available one in the latter genus.

***Ruellia matagalpae* Lindau**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: July–March; fruiting: February–March, July–August.

Habitats.— Wet forests, tall forests, along streams; 230–665 m.

Alta Verapaz: *Wilson 270* (F). **Izabal**: *Pozuelos s.n.* 3 XII 1976 =*PEA 5910* (USCG). **Petén**: *Contreras 10438* (F, LL, US).

***Ruellia maya* T.F. Daniel**

Recent descriptions.— Daniel (1995a, 1995b).

Phenology.— Flowering: September–March; fruiting: January.

Habitats.— Wet montane forests, riparian forests, along streams; 300–1400 m.

Local name.— "r-uę́'u'ux kamenaq" (Quecchí; *Wilson 40877*).

Local use.— Graveyard ornamental (*Wilson 40877*).

Alta Verapaz: *von Tuerckheim II-832* (F, MO, US).

Ruellia maya is endemic to Chiapas and Guatemala. Gibson (1974) treated these plants as *Ruellia longituba* D.N. Gibson. Daniel (1995a) noted that the species represented by syntypes of this name are apparently not known from Guatemala. *Wilson 40877* (F), also from Alta Verapaz, notes the Quecchí name cited above in reference to "dead person's flower," and notes its use as a graveyard ornamental; this plant apparently grew "feral" in a former graveyard (now forest) near San Juan Chamelco. The species was collected in 2010 (*Daniel & Véliz 11340* at BIGU, CAS, K, MO) along the Río Sachichá in Alta Verapaz where fewer than 10 plants were noted.

***Ruellia megasphaera* Lindau**

Recent Description.— Daniel (1995b).

Phenology.— Flowering: December–March; fruiting: January–March.

Habitats.— Dry forests, wooded ravines, moist to dry thickets; 300–780 m.

Chimaltenango: *Johnston 525* (F). **Chiquimula**: *Tejada 212* (USCG). **Escuintla**: *Standley 89551* (F). **Guatemala**: *Aguilar 452* (F). **Retalhuleu**: *Standley 88170* (F). **Santa Rosa**: *Steyermark 33172* (F).

Plants referable to this species were treated by Gibson (1974) as *R. parva* (Nees) Hemsl., which name applies to another species (Daniel 1990c).

***Ruellia metallica* Leonard in P.C. Standley, Publ. Field Mus. Nat. Hist., Bot. Ser. 18:1253. 1938. Type.**— COSTA RICA. **Limón**: Zent banana farm, sea level, 2 May 1903, O. *Cook & C. Doyle 456* (holotype: US!).

Terrestrial to subepiphytic perennial herbs to 5 dm tall. Young stems quadrate to quadrate-sulcate to ± flattened, pubescent with retrorse eglandular trichomes 0.3–0.6 mm long, trichomes usually ± restricted to 4 or more longitudinal lines. Leaves petiolate, petioles to 40 mm long, blades ovate-elliptic to elliptic to lanceolate, 40–157 mm long, 8.5–74 mm wide, 2.1–8.1 times longer than wide, usually becoming smaller and narrower distally and intergrading with bracts, acute to acuminate at apex, acute to subattenuate at base, margin (entire to) crenate-sinuate, adaxial surface glabrous or nearly so, abaxial surface pubescent along major veins with antrorse eglandular trichomes. Inflorescence of dichasia borne in axils of distal leaves and/or bracts, usually forming a terminal spicate axis, rachis (if present) pubescent like young stems; dichasia opposite, 1–3 (or more?) per axil, sessile to subsessile (i.e., peduncles to 0.5 mm long), 1–3 (or more?)-flowered. Bracts intergrading with leaves proximally, lanceolate to linear, 5–22 (–31) mm long, 0.8–3 mm wide, abaxial surface pubescent with antrorse eglandular trichomes 0.2–0.3 mm long (usually ± restricted to midvein), margin ciliate with flexuose to antrorse eglandular trichomes. Bracteoles triangular to subulate to oblanceolate to subspatulate, 2–7.5 (–14) mm long, 0.7–1 mm wide, abaxial surface pubescent like bracts, secondary bracteoles (if present) similar to bracteoles except smaller. Flowers sessile to subsessile (i.e., pedicels to 1 mm long). Calyx 4.3–7.2 (–8.5 in fruit) mm long, lobes lance-subulate, 3–5.8 (–7) mm long, 0.6–0.7 mm wide, abaxially inconspicuously glandular punctate and sparsely pubescent with antrorse eglandular trichomes 0.05–0.1 mm long, the eglandular trichomes sometimes nearly absent. Corolla white to lavender (sometimes with the major veins of lobes pinkish), 21–33 mm long, externally pubescent with erect to flexuose to retrorse eglandular and glandular trichomes 0.05–0.2 mm long, tube 15–25 mm long, narrow proximal portion 8–14 mm long, ± abruptly expanded into throat, throat 7–14 mm long, longer or shorter or nearly equal to narrow proximal portion, 3.5–6 mm in diameter near midpoint, limb 9–17 mm in diameter, lobes 4–7.5 mm long, 3.5–6.5 mm wide. Stamens included, didynamous, shorter pair

3.5–4.5 mm long, longer pair 6–8 mm long, thecae 1.4–1.7 mm long, dorsally glabrous or glandular pubescent. Style included, 13–20 mm long, pubescent (sometimes inconspicuously so) with eglandular and glandular (sometimes inconspicuous or absent) trichomes, stigma usually 1-lobed, lobe 0.8–1.2 mm long. Capsule clavate, 10–12 mm long, puberulent with antrorse eglandular and sessile glandular trichomes less than 0.05 mm long, stipe 5–6 mm long, head ellipsoid to obovoid, 5–6 mm long. Seeds up to 8 (usually fewer by abortion) per capsule, lenticular, 2.2–3.3 mm long, 1.9–3 mm wide, surfaces ± smooth (microscopically striate), margin covered with hygroscopic trichomes (appearing papillose-fringed in dry state).

PHENOLOGY.— Flowering: April; fruiting: April, November.

HABITAT.— Wet forests; 30–600 m.

Izabal: *Steyermark 38716* (F). **Santa Rosa**: *Standley 78364* (F).

***Ruellia nudiflora* (Engelm. & A. Gray) Urb.**

RECENT DESCRIPTIONS.— Daniel (1995b, 1997b, 1999a), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: (January–) March–November; fruiting: (January–) March–November.

HABITATS.— Forests (acaguales, corozoles, ramonales), distrubed sites (e.g., roadsides, clearings, pastures); 100–250 m.

LOCAL NAMES.— "Campanilla" (*Kufer 8*), "violeta silvestre" (*Zabala s.n.* 6 IX 1984).

Chiquimula: *Kufer 8* (UVAL). **Petén**: *Egler 42-312* (F). **Zacapa**: *Deam 6317* (F, MICH, MO, US).

Cleistogamous flowers, which begin to appear in January, are borne on the basal or near basal axillary panicles. Chasmogomous flowers are produced in terminal panicles that usually appear somewhat later (April). Sometimes cleistogamous flowers are also borne in the terminal panicles (e.g., early in the flowering season).

Gibson (1974) included Guatemala and Santa Rosa among the departments in which *Ruellia nudiflora* occurs. Some collections from the former department pertain to *R. puberula* (see below), which Gibson (1974) treated as conspecific with *R. nudiflora*. She annotated *Standley 79450* from Santa Rosa (along the Avellana road, S of Guazacapán, 150 m, 6 Dec 1940-flr, frt, at F) with the name *R. nudiflora* but plants on this collection appear more like *R. puberula* (i.e., they lack a terminal glandular thyrse, the corollas are not conspicuously glandular pubescent, and the capsules lack glandular trichomes).

***Ruellia paniculata* L.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: October–March; fruiting: October–May.

HABITATS.— Short forests, dry forests, swamp margins, dry to moist thickets, disturbed sites (e.g., clearings); 0–700 m.

Chiquimula: *Pittier 1898* (US). **Escuintla**: *Pearsall 10222* (UVAL). **Jutiapa**: *Steyermark 31800* (F). **Petén**: *Tún Ortíz 893* (F, MO). **Retalhuleu**: *Standley 87675* (F, US). **San Marcos**: *Steyermark 37853* (F, US). **Zacapa**: *Steyermark 29234* (F).

Guatemalan specimens that note flower color reveal that plants with purple/blue (lavender) corollas are either the most prevalent (or the only) floral color form in the country.

***Ruellia pereducta* Standl.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: February–June; fruiting: February–June.

HABITATS.— Rain forests, montane forests, tall forests, ramonales, zapotales; 90–340 m.

Alta Verapaz: *Steyermark 45181* (F, US). **Izabal**: *Johnson 1232* (US). **Petén**: *Lundell 16774* (CAS, F, LL).

This species is sometimes identified as *R. stemonacanthoides*. These two species have simlar inflorescences, capsules, and seeds and are likely closely related. Guatemalan plants of each can be distinguished by the following couplet:

1. Peduncles quadrate-alate; stamens 17–22 mm long, thecae 2.2–3.2 mm long, usually at least partially exserted from mouth of corolla; flowers pedicellate, pedicels 1.2–6 mm long; corolla pinkish or reddish (sometimes reported as bluish or purplish), narrow proximal portion of tube 9–14 mm long, throat ± cylindric, 14–26 mm long (longer than narrow proximal portion); plants of the Caribbean versant. . . . . *R. pereducta*
1. Peduncles terete to subquadrate; stamens 6–10 mm long, thecae 1.8–2 mm long, included in corolla tube; flowers sessile or subsessile (i.e., pedicels to 2 mm long); corolla blue-purple; narrow proximal portion of tube 17–21 mm long, throat obdeltate, 12–13 mm long (shorter than narrow proximal portion); plants of the Pacific versant . . . . *R. stemonacanthoides*

Although corollas of *R. stemonacanthoides* are blue-purple (often lavender), those of *R. pereducta* from Guatemala are described as either reddish, pinkish, or bluish (e.g., reddish, reddish-lilac, deep pink, red-purple, lilac, carmine, lilac-carmine, pink, blue, and light purple). Whether more than variation on a single color is present in the latter species remains to be determined.

Ruellia puberula (Leonard) Tharp & F.A. Barkley

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: April–June; fruiting: June.

HABITATS.— Disturbed sites (e.g., pastures, clearings); 110–1120 m.

Chiquimula: *Steyermark 30344* (F). **Guatemala**: *Pittier 135* (US). **Jutiapa**: *Morales et al. 2486* (USCG). **Petén**: *Zomer 267* (F). **Zacapa:** *Deam 6318* (holotype of *R. nudiflora* var. *puberula* Leonard: US; isotypes: F, MICH).

Gibson (1974) included this taxon within *R. nudiflora*; Daniel (1995b) treated them as separate species. Among Guatemalan collections, corollas vary from 25 to 47 mm in length with the narrow proximal portion of the tube 6 to 13 mm long and the throat 12 to 20 mm long; capsules are pubescent throughout (although somewhat sparser proximally) with erect to flexuose to retrorse eglandular trichomes 0.1 to 0.2 mm long, and often with a few scattered erect glandular trichomes at and/or near the apex. Like plants from El Salvador (Daniel 2001), some Guatemalan plants have eglandular calyces (e.g., *Pittier 135*) and others have glandular calyces (e.g., *Deam 6332*).

Ruellia pygmaea Donn. Sm., Bot. Gaz. (Crawfordsville) 48:298. 1909. TYPE.— GUATEMALA. Alta Verapaz: near Cubilquitz, 600 m, May 1904, *H. von Tuerckheim 8725* (holotype: US!).

Decumbent to erect herbs to 2 dm tall. Young stems quadrate-sulcate, ± evenly pubescent with retrorse to retrorsely appressed eglandular trichomes 0.3–0.7 mm long, sometimes with an overstory of erect to flexuose eglandular trichomes to 1.8 mm long as well. Leaves petiolate, petioles to 10 mm long, blades ovate to ovate-elliptic, 14–53 mm long, 8–27 mm wide, 1.6–2.5 times longer than wide, acute to subattenuate at apex, acute at base, margin entire, ciliate, abaxial surface pubescent with antrorse to antrorsely appressed eglandular trichomes along major veins and flexuose to antrorse eglandular trichomes in intercostal regions. Inflorescence of densely bracteate terminal dichasiate spikes to 4.5 cm long, distal pair of leaves sometimes also bearing dichasia; dichasia opposite, sessile, 1-flowered. Bracts subfoliose, petiolate, ovate-elliptic to elliptic, 11–30 mm long, 4.7–13.5 mm wide, abaxial surface pubescent with understory of antrorse to antrorsely appressed eglandular trichomes to 0.5 mm long along major veins and with an evenly disposed overstory of flexuose eglandular trichomes to 1.8 mm long, margin ciliate with overstory type trichomes and sometimes with an understory of scattered and inconspicuous erect glandular trichomes to 0.1 mm long as well. Bracteoles oblanceolate to obovate, 3.5–6.5 mm long, 0.6–1 mm wide, abaxial surface pubescent like bracts (sometimes very sparsely so). Flowers sessile to subsessile (i.e., pedicels to 0.5 mm long). Calyx 3.5–4 mm long, tube 1 mm long, lobes subulate, 2.5–3 mm long, abaxially pubescent (sometimes very sparsely so) with flexuose eglandular trichomes 0.2–0.3 mm long. Corolla blue-purple, 17–26 mm long, externally pubescent with erect to flexuose eglandular and glandular (sometimes sparse and inconspicuous) trichomes 0.05–0.2 mm long, tube 17–19 mm long, narrow proximal portion 6–9 mm long, ± abruptly expanded into throat, throat 6.5–11 mm long, 4–5 mm in diameter near midpoint, lobes 4–7.5 mm long, 4–6.5 mm wide. Stamens didynamous, included in throat, 5–7 mm long, filaments of distal pair glandular, thecae 1.7–2 mm long. Style 13 mm long, pubescent with eglandular trichomes, stigma 1-lobed, 1.2–1.3 mm long. Capsule capitate, 7.5–9.5 mm long, pubescent with erect to flexuose eglandular trichomes 0.1–0.2 mm long, stipe 3–3.5 mm long, head ellipsoid to obovoid, 4.5–6 mm long. Seeds 4, lenticular, 2.3–2.4 mm long, 2–2.3 mm wide, margin (only) covered with hygroscopic trichomes.

PHENOLOGY.— Flowering: January (cleistogamous flowers)–March–June (chasmogamous flowers); fruiting: January–June.

HABITATS.— Lower montane rain forests, wet forests, tall forests, wooded slopes, wet thickets; near sea level–600 m.

LOCAL NAME.— "Rash-ru-quén" (*Steyermark 44671*).

LOCAL USE.— "Fresh leaves applied to eye lids with eyes closed said to relieve reddening of eyes" (*Steyermark 44671*).

Alta Verapaz: *Steyermark 44671* (F, US). **Izabal**: *Daniel et al. 11244* (BIGU, CAS, MO). **Petén**: *Pöll s.n.* 22 VII 1993 (UVAL).

This species is endemic to Guatemala and Belize. Gibson's (1974) description of the calyx and corolla appears to be missing a portion of text. Pollen of this species, which is typical of the genus (i.e., 3-porate with interapertural surfaces coarsely reticulate), is illustrated here for the first time (Fig. 8).

Ruellia spissa Leonard

RECENT DESCRIPTIONS.— Daniel (1995b), Daniel and Acosta (2003).

PHENOLOGY.— Flowering: May–August; fruiting: July–August.

HABITAT.— Unknown; 1400–1515 m.

LOCAL NAME.— "Maravilla celeste" (*Tonduz 620*).

Guatemala: *Tonduz 620* (holotype of *R. pratensis* D.N. Gibson: F; isotypes: AGUAT, US). **Huehuetenango**: *Seler & Seler 2984* (US).

Gibson (1972, 1974) treated this species as *R. pratensis*, a taxonomic synonym (see Daniel 1995b), and provided an illustration of it. In Chiapas plants occur in pine-oak forests.

Ruellia standleyi Leonard, J. Wash. Acad. Sci. 31:98. 1941. TYPE.— GUATEMALA. Quezaltenango: Finca Pireneos, below Santa María de Jesús, 1350–1380 m, 11 Mar 1939, *P. Standley 68390* (holotype: F).

Herbs to 1.2 m tall. Young stems quadrate to quadrate-sulcate to ± flattened, pubescent with erect to flexuose glandular and eglandular trichomes 0.2–1 (–1.5) mm long (viscid), trichomes evenly disposed or ± concentrated in 2 lines. Leaves petiolate, petioles to 90 mm long, blades ovate to elliptic, 43–176 mm long, 23–96 mm wide, 1.7–2.2 times longer than wide, acute-apiculate at apex, acute to subattenuate at base, margin crenate-dentate, surfaces viscid. Inflorescence of terminal (sometimes with new axillary growth overtopping inflorescence which then appears axillary) dichasiate racemes (to thyrses) to 21 cm long, peduncle and rachis viscid (trichomes sometimes mostly glandular); dichasia opposite, borne in axils of reduced distal leaves and bracts, sessile to subsessile (peduncles to 1 mm long) or with proximalmost pair sometimes borne on peduncles to 20 mm long, (1–) 3–many-flowered, expanded via viscid secondary peduncles to 17 mm long. Bracts obovate to oblanceolate to elliptic, 3–19 mm long, 1.5–3 mm wide, abaxial surface viscid, proximalmost bracts often subfoliose and up to 70 × 11 mm. Bracteoles linear to elliptic to oblanceolate, 2.5–4.5 (–7) mm long, 0.5–1.2 mm wide, abaxial surface viscid; secondary bracteoles similar to bracteoles. Flowers sessile to subsessile (pedicels to 1 mm long). Calyx 6–11 mm long (–17 mm long in fruit), tube 1–1.5 (–2) mm long, lobes subulate, 5–9.5 mm long (–16 mm long in fruit), abaxially viscid. Corolla greenish white to yellowish, 11–19 mm long, externally pubescent with flexuose eglandular (and sometimes glandular as well) trichomes 0.3–0.8 mm long, tube 8–10 mm long, narrow proximal portion 2–3 mm long, abruptly expanded into throat, throat 6.5–9 mm long, 3.5–5.5 mm in diameter near midpoint, lobes 2.5–5 mm long, 2–4.3 mm wide. Stamens didynamous, shorter pair 3.5–5 mm long, longer pair 5–7 mm long, thecae 1.8–2.2 mm long. Style 7–8 mm long, pubescent (at least proximally) with eglandular trichomes, stigma 1-lobed, 0.6–1 mm long. Capsule narrowly ellipsoid (linear), 11–16 mm long, ± sparsely pubescent distally with erect to flexuose glandular and eglandular trichomes 0.1–0.3 mm long. Seeds 12 per capsule, 2.2–2.5 mm long, 2–2.4 mm wide, surfaces and margin covered with appressed hygroscopic trichomes.

PHENOLOGY.— Flowering: February–April, July; fruiting: February–April, July, December.

HABITATS.— Moist forests, tall forests, moist to wet thickets; 300–1350 m.

Petén: *Contreras 10435* (F, LL, US). **Quezaltenango**: *Standley 87974* (F). **San Marcos**: *Steyermark 52314* (F). **Suchitepéquez**: *Standley 66970* (F).

This species is unusual among Mesoamerican *Ruellia* because of its relatively small, funnelform, and greenish white or yellowish corollas. It is unique among North American and Central American *Ruellia* by the combination of its greenish white to yellowish corollas, crenate-dentate leaf margins, viscid pubescence, and narrowly ellipsoid capsules. The well developed inflorescence is a result of elongate secondary peduncles among the dichasia. Its pollen, which is typical for *Ruellia*, was illustrated in Daniel (1993b).

***Ruellia stemonacanthoides* (Oerst.) Hemsl.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: January–March; fruiting: January–March.

HABITATS.— Dense forests, wooded ravines, moist thickets, along streams; 80–800 m.

LOCAL NAME.— "Lilu" (*Morales R. 1051*).

Escuintla: *Donnell Smith 2115* (lectotype of *R. guatemalensis* Donn. Sm.: US; isolectotype: K). **Retalhuleu**: *Donnell Smith 2692* (syntype of *R. guatemalensis*: US). **San Marcos**: *Steyermark 37563* (F). **Suchitepéquez**: *Morales R. 1051* (AGUAT, F).

In addition to the collections noted above, Gibson (1974) reported this species from the department of Guatemala (undoubtedly based on her annotation of *Aguilar 553* at F, from an unstated locale in that department, but which does not pertain to that species and which does not permit identification due to the lack of mature flowers or fruits), and MacVean (2006) reported it from Sololá. I have not seen any collections from those departments that pertain to *R. stenonacanthoides*.

Gibson (1974) noted that the "type" of *R. guatemalensis* was *Donnell Smith 2115*, and she annotated the specimen at US of this collection as the holotype. Because no holotype was designated in the protologue, this specimen is a syntype. If Gibson's published indication (combined with her annotation) of this collection as the type does not fulfill the requirements of the *International Code of Botanical Nomenclature* (McNeill et al. 2006) for lectotypification, then *Donnel Smith 2115* at US is designated here as lectotype of *R. guatemalensis*.

The distinctions between *R. stemonacanthoides* and the morphologically similar *R. pereducta* are noted under the latter species above.

***Ruellia tuberosa* L.**

RECENT DESCRIPTIONS.— Correll and Correll (1982); Fournet (2002).

PHENOLOGY.— Flowering: July; fruiting: July.

HABITAT.— Along streams; 300 m.

Izabal: *P. Herrara s.n.* 2-VII-2003 (BIGU, MO).

This collection from "Entre Ríos, La Jutera" was made on 2 July 2003 and apparently represents the first collection of the species in Guatemala. It greatly resembles collections of *R. tuberosa* from the Carribean lowlands of Honduras, where plants are apparently both cultivated and naturalized. The collection noted above would appear to represent a naturalized occurrence. A white-flowered form of this mostly blue-flowered species is also cultivated in Guatemala (e.g., *Véliz 20689* at BIGU). *Ruellia tuberosa* is purportedly native to the West Indies and northern South America (Leonard 1951).

***Sanchezia parvibracteata* Sprague & Hutch.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: January–February; fruiting: unknown.

HABITAT.— Moist thickets; 235–600 m.

Quezaltenango: *Standley 87961* (F). **Retalhuleu**: *Kellerman 6642* (F). **Suchitepéquez**: *Steyermark 35368* (F).

Gibson (1974) indicated that this species was widely planted and sometimes naturalized in Guatemala. Standley's collection from Quezaltenango noted that plants were naturalized. Steyermark's collection from the southern lower slopes of Volcán Zunil, near Finca Las Nubes at 500–800 m, was not noted to be cultivated and might represent a naturalized occurrence. Kellerman's collection also does not indicate cultivation. Other collections from Guatemala were noted to have been cultivated. The species appears to be native to South America, and possibly southern Central America (Daniel 1995b).

***Schaueria parviflora* (Leonard) T.F. Daniel**

RECENT DESCRIPTION.— Daniel (1990b).

PHENOLOGY.— Flowering: March–May; fruiting: March–May.

HABITAT.— Wet forests; near sea level.

Izabal: *Standley 72949* (holotype of *Streblacanthus parviflorus* Leonard: F; isotype: US).

Gibson (1974) treated this species as *Streblacanthus parviflorus*, a nomenclatural synonym (see Daniel 1990b). *Schaueria parviflora* also occurs in southern Mexico, where it has been collected numerous times in the past 25 years.

***Spathacanthus hahnianus* Baill.**

RECENT DESCRIPTIONS.— Daniel (1995b, 1999b).

PHENOLOGY.— Flowering: August; fruiting: unknown.

HABITATS.— Wet forests, forest borders; ca. 1150 m.

Alta Verapaz: *von Tuerckheim 1030* (holotype of *Macfadyena simplicifolia* Donn. Sm.: US; isotypes: GH, K, M, US).

Spathacanthus hahnianus is rare or possibly extirpated in Guatemala, known from a single locality in Honduras, and widespread and well collected in eastern and southern Mexico. Gibson (1974) treated this species as *Spathacanthus simplicifolius* (Donn. Sm.) Leonard, a taxonomic synonym (see Daniel 1995b, 1999b).

***Spathacanthus parviflorus* Leonard**

RECENT DESCRIPTIONS.— Daniel (1995b, 1999b).

PHENOLOGY.— Flowering: January, May–August; fruiting: January–February, June–September.

HABITATS.— Rain forests, moist forests, montane forests, moist mixed forests, cloud forests, slopes, along streams; 970–2000 m.

LOCAL NAMES.— "La flor copal de montaña" (*Steyermark 33607*); "violeta de montaña" (*White 5419*).

Chimaltenango: *Steyermark 52100* (F, US). **Guatemala**: *Hatch & Wilson s.n.* 17 Aug 1936 (F). **Quezaltenango:** *Skutch 961* (holotype: US; isotypes: A, BM, L, NY, US). **San Marcos**: *Croat 40846* (CAS, MO). **Sololá**: *Hatch & Wilson 342* (F). **Suchitepéquez**: *Steyermark 46632* (CAS, F, NY, US).

***Stenandrium dulce* (Cav.) Nees**

RECENT DESCRIPTIONS.— Daniel (1985, 1999a), Daniel and Acosta (2003).

PHENOLOGY.— Flowering: March, June–July; fruiting: July.

HABITAT.— Unknown; ca. 200 m.

Alta Verapaz: *von Tuerckheim 3588* (holotype of *S. guatemalense* Leonard: US; isotypes: GH, K). **Petén**: *Lundell 3707* (F, MICH).

Although poorly collected in Guatemala, this species is widespread (USA to Chile) and elsewhere often abundant in diverse communities including arid associations, dry forests, grasslands, and pine forests.

***Stenandrium pedunculatum* (Donn. Sm.) Leonard**

RECENT DESCRIPTIONS.— Daniel (1985, 1995b).

PHENOLOGY.— Flowering: June, October; fruiting: June, November.

HABITATS.— Moist thickets, wet ravines, moist and brushy slopes; 185–1400 m.

Huehuetenango: *Steyermark 51400* (F). **Jalapa**: *Standley 77063* (F). **Jutiapa**: *Standley 75318* (F). **Zacapa:** *Deam 6277* (holotype of *Blechum pedunculatum*: US; isotypes: GH, LL, MICH, MO).

***Stenandrium subcordatum* Standl.**

RECENT DESCRIPTION.— Daniel (1985).

PHENOLOGY.— Flowering: March; fruiting: March, July.

HABITATS.— Zapotales, savannas, dry arroyos; 180–250 m.

Petén: *Bartlett 12283* (CAS, K, MICH, TEX, US).

This species is not well collected in Guatemala, but was collected as recently as 1992 in Petén (*Pöll & Escobar s.n.* 5 VII 1992 at UVAL).

***Stenostephanus azureus* (D.N. Gibson) T.F. Daniel, comb. nov.**

Habracanthus azureus D.N. Gibson, Fieldiana, Bot. 34:59. 1972. TYPE.— GUATEMALA. **San Marcos:** W-facing slope of Sierra Madre, near Aldea Fraternidad, between San Rafael Pie de la Cuesta and Palo Gordo, 1800–2400 m, wet mountain forest, 10–18 Dec 1963, *L. Williams et al. 25808* (holotype: F!).

Perennial herbs to 2 m tall. Young stems subquadrate to quadrate-sulcate, pubescent with flexuose to antrorse to retrorse eglandular trichomes 0.2–0.8 (–1.2) mm long, trichomes with ± conspicuous maroon septae, ± evenly disposed or concentrated in 2 lines. Leaves petiolate, petioles to 60 mm long, blades elliptic, 27–230 mm long, 14–86 mm wide, 1.7–3.5 times longer than wide, acute to acuminate at apex, (rounded to) acute to attenuate at base, surfaces pubescent (especially along major veins) with flexuose to antrorse eglandular trichomes, margin entire, ciliate. Inflorescence of (axillary and) terminal pedunculate thyrses to 280 mm long, peduncle and rachis often dark maroon-black, quadrate to ridge-angled to somewhat flattened, glabrous (or proximally pubescent with sparse trichomes like those of young stems or rarely pubescent with flexuose glandular trichomes to 0.7 mm long); dichasia opposite, (1–) 3–many-flowered, pedunculate, peduncles 7–29 mm long, glabrous (or rarely pubescent with glandular trichomes like those of rachis). Bracts (linear to) subulate to triangular-subulate, 1–3 mm long, 0.4–0.8 mm wide, (rounded to) acute at apex, abaxial surface glabrous (or rarely pubescent with glandular trichomes like those of rachis). Bracteoles subulate to triangular-subulate, 1–2.5 mm long, 0.5–0.7 mm wide, abaxial surface glabrous (or rarely pubescent with glandular trichomes like those of rachis). Flowers subsessile to short-pedicellate, pedicels 0.2–1.5 mm long, glabrous (or rarely pubescent with glandular trichomes like those of rachis), lateral flowers borne on secondary peduncles (3–) 8–16 mm long. Calyx dark maroon-black, 5–11 mm long (up to 20 mm long in fruit), abaxial surface glabrous or with sessile to stipitate glandular trichomes to 1 mm long (these sometimes restricted to distal half of lobes), lobes linear to lance-linear, 5–12 (–19) mm long, subequal to unequal in length, 0.4–1 mm wide. Corolla linear-elliptic in bud, blue-purple, 18–25 mm long, externally glabrous, tube 13–18 mm long, abruptly expanded into throat, narrow proximal portion 3–6 mm long, throat ± saccate, 10–13 mm long, 4.5–7 mm in diameter near midpoint, upper lip straightforward to curved upward, 5–7 mm long, lower lip straightforward, 5–6.3 mm long, 3-lobed, lobes 1.5–2 mm long, 1.2–2 mm wide. Stamens inserted near base of throat, 18–27 mm long, filaments blue-purple, thecae blue-purple, 2.8–3.8 mm long; pollen globose-elliptic, 2 circular regions echinate to tuberculate, peripheral band continuous, rugose and with a central band of echinae. Style 24–32 mm long, stigma 0.1 mm long. Capsule 11–15 mm long, glabrous. Seeds lenticular, 2.5–3 mm long, 1.9–2.5 mm wide, prominently tuberculate with conical tubercles when immature, becoming ± tuberculate to rugose-ridged (or with the ornamentation sometimes becoming ± restricted toward the periphery of the seed) to ± smooth when mature.

PHENOLOGY.— Flowering: December–April; fruiting: December–April.

HABITATS.— Wet montane forests, cloud forests, slopes; 1600–2775 m.

Alta Verapaz: *Standley 91480* (F). **San Marcos**: *Williams et al. 26267* (F, GH, NY, US).

Stenostephanus azureus is endemic to Guatemala (Alta Verapaz, San Marcos), and has been collected at least once in Alta Verapaz and at least eight times in San Marcos (as recently as 2010: *Daniel et al. 11300* at BIGU, CAS, MO). Along a trail on the wet montane slopes facing Volcán Tajumulco in the Bosque Municipal de San Marcos reserve, only two or three low herbs (to 5 dm tall) were seen in January 2010. Along this same trail an abundance of robust plants to 1.8 m tall was noted by M. Véliz in February 2006 (pers. comm.; *Véliz et al. 16741* at BIGU). These observations suggest that a plietesial life history is possible for this species (cf. Daniel 2006). Although extant and apparently thriving in at least one protected reserve, the conservation status of *S. azureus* remains unknown. Gibson (1972; as *Habracanthus azureus*) provided an illustration of the species. The presence/absence of glands on the calyx often varies within an inflorescence (e.g. *Véliz et al. 16741* has some inflorescences with no glands and others that have conspicuous glands). *Stenostephanus azureus* can be distinguished from the morphologically similar *S. latilabris* by the characters in the following couplet:

Bracts subulate to triangular subulate, (rounded to) acute at apex, 0.4–0.7 mm wide; flowers ± pendulous; calyx 5–11 (–13.5) mm long, lobes 5–12 mm long; corolla 18–25 mm long, tube 13–16 mm long, abruptly expanded into throat, throat ± saccate, 10–12 mm long, 4.5–7 mm in diameter near midpoint; stamens inserted near base of throat; style 24–32 mm long . . . . *S. azureus*

Bracts triangular to linear-elliptic, rounded to subacute at apex, 0.7–1.2 mm wide; flowers not pendulous; calyx 4–6 mm long, lobes 3.5–5 mm long; corolla 10–14.5 mm long, tube 4–6 mm long, lacking a well-defined or saccate throat, 0.9–1.4 mm in diameter near midpoint; stamens inserted in distal 1/2–1/3 of corolla tube; style 11–14 mm long . . . . *S. latilabris*

***Stenostephanus latilabris* (D.N. Gibson) T.F. Daniel**

RECENT DESCRIPTIONS.— Daniel (1995b, 1999c).

PHENOLOGY.— Flowering: December–January, July; fruiting: unknown.

HABITATS.— Cloud forests, along streams, clearings; 1515–2200 m.

Baja Verapaz: *Williams et al. 43128* (F). **Quiché**: *A. Skutch 1836* (holotype of *Habracanthus latilabris* D.N. Gibson: US; isotype: A). **San Marcos**: *Daniel et al. 11325* (BIGU, CAS, K, MO, US).

Gibson (1974) treated this species as *Habracanthus latilabris*, a nomenclatural synonym (see Daniel 1995b). Gibson (1972) provided an illustration of the species. Capsules of *S. latilabris* remain unknown.

Stenostephanus latilabris is endemic to Guatemala and a bordering region of Chiapas. It is known from six collections, including recent ones from both countries. During studies in San Marcos in January 2010 a large population (more than 100 plants, many of which were not in flower) of the species was located along a stream in a ravine.

***Stenostephanus monolophus* (Donn. Sm.) T.F. Daniel**

RECENT DESCRIPTIONS.— Daniel (1995b, 1999c).

PHENOLOGY.— Flowering: September–March; fruiting: October–April.

HABITATS.— Dense and wet mixed forests, moist evergreen forests, cloud forests, moist to wet thickets, deep ravines; 1500–2700 m.

LOCAL NAME.— "Coqueta" (*Morales R. 1237*).

Alta Verapaz: *Standley 90561* (F, US). **Chimaltenango:** *J. Morales R. 1237* (holotype of *Glockeria moralesii* Standl.: F; isotype: AGUAT). **Escuintla**: *Standley 61282* (F, US). **Quezaltenango**: *Breedlove & Almeda 64849* (CAS, BR, F, K, MICH, MO, US). **Sacatepéquez:** *Heyde & Lux 4556* (holotype of *Glockeria monolopha* Donn. Sm.: US; isotypes: GH, K, US). **San Marcos**: *Standley 66171* (F). **Sololá**: *Molina R. & Molina 26674* (F, US).

Gibson (1974) treated this species (Fig. 13) as *Hansteinia monolopha* (Donn. Sm.) D.N. Gibson, a nomenclatural synonym (see Daniel 1995b, 1999c). Daniel (1999c) noted considerable variation in pubescence among Chiapan collections of this species. Guatemalan plants also exhibit variation in pubescence. For example, vesture of the inflorescence rachises and calyces varies from densely pubescent with stipitate glandular trichomes (e.g., *Daniel & Veliz 11209* from Sacatepéquez) to sparsely pubescent with stipitate glandular trichomes (e.g., *Heyde & Lux 4556*)

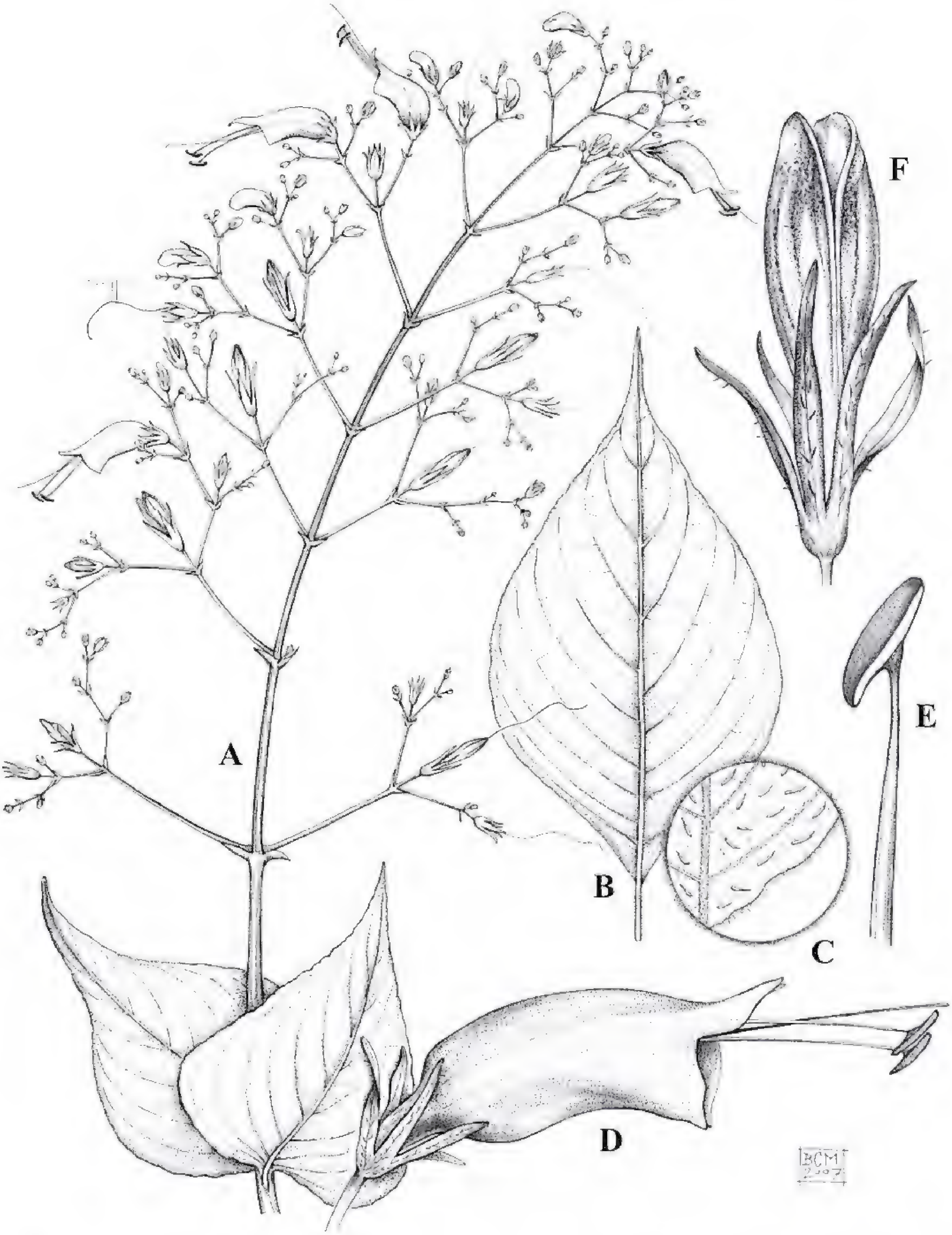


FIGURE 13. *Stenostephanus monolophus* (*Breedlove & Almeda 64849*). A. Habit, × 0.7. B. Proximal leaf, × 0.5. C. Adaxial surface of leaf, × 5. D. Flower, × 2.7. E. Distal portion of stamen with anther, × 7. F. Capsule, × 4.5. Drawn by B. Mendoza.

to lacking stipitate glandular trichomes (e.g., *Molina R. & Molina 26674*). One of these less glandular forms (*Vaght 301* from Quetzaltenango) was referred to the morphologically similar species, *Stenostephanus glaber* (Leonard ex Lundell) T.F. Daniel, by Gibson (1974; as *Hansteinia glabra*). Examination of *Vaght 301* at US reveals it to have diagnostic characters of *S. monolophus* (e.g., dorsally red and ventrally yellow corollas). Thus, the known distribution of *S. glaber* is restricted to Chiapas, Mexico. Daniel (1999c) provided a description and Lundell (1941) provided an illustration of the latter species. It might be expected to occur in Guatemalan cloud forests, and can be readily distinguished from *S. monolophus* by its bicolored corolla that is white distally and red or dark reddish purple proximally.

Stenostephanus ruberrimus (D.N. Gibson) T.F. Daniel, comb. nov.

Habracanthus ruberrimus D.N. Gibson, Fieldiana, Bot. 34:62. 1972. TYPE.— GUATEMALA. **Alta Verapaz:** between Chamá and Cobán, 1500 ft., 15 Aug 1920, *H. Johnson 491* (holotype: F!; isotype: US!).

Shrubs to 2.5 m tall. Young stems subterete to subquadrate, bifariously pubescent (sometimes ± inconspicuously so) with antrorse to antrorsely appressed eglandular trichomes 0.1–0.3 mm long, sometimes soon glabrate. Leaves petiolate, petioles to 70 mm long, blades ovate-elliptic to elliptic, (40–) 65–225 mm long, (11–) 21–77 mm wide, 2.7–4.2 times longer than wide, acuminate to caudate-falcate at apex, attenuate at base, abaxial surface glabrous, adaxial surface with antrorse to antrorsely appressed eglandular trichomes along major veins (or restricted to midvein), margin entire to subcrenate, ciliate. Inflorescence of terminal sessile to pedunculate thyrses to 260 mm long (including peduncle, if present), peduncle and rachis ± flattened to ridge-angled, ± inconspicuously bifariously pubescent with antrorse to antrorsely appressed eglandular trichomes 0.05–0.2 mm long; dichasia opposite, (1–) 3–many-flowered, pedunculate, peduncles 3–13 mm long, pubescent with trichomes like those of rachis. Bracts subulate, 1–3.5 long, 0.4–0.8 mm wide, abaxial surface glabrous or with a few trichomes like those of rachis. Bracteoles subulate, 0.8–2 mm long, 0.3–0.7 mm wide, glabrous or pubescent like bracts. Flowers pedicellate, pedicels 1.5–3 mm long, pubescent like rachis, lateral flowers borne on secondary peduncles 4–9 mm long. Calyx (2.5–) 4.5–6 mm long, abaxially glabrous, lobes subulate, (2–) 4–5.2 mm long, subequal in length, (0.3–) 0.7–0.9 mm wide, margin ciliolate. Corolla (sublinear to) c-shaped in bud, red, 25–36 mm long, externally papillose with papillae less than 0.05 mm long, tube 14–16 mm long, gradually to ± abruptly expanded into a throat, narrow proximal portion 5–7 mm long, throat 8–10 mm long, 3–4.5 mm in diameter near midpoint, upper lip straightforward to spreading-erect, strap-shaped, 13.5–23 mm long, 0.7–2 mm wide, lower lip straightforward to recurved, 3-lobed, 13.5–18 mm long, 5–6 mm wide, lobes 0.5–2 mm long, 0.3–0.6 mm wide. Stamens inserted near base of throat, 23–35 mm long, thecae red, 2.8–4 mm long; pollen globose-elliptic, 2-porate, surface of circular regions sparsely gemmate, peripheral band apparently continuous, gemmate. Style red, 31–50 mm long, stigma 0.1 mm long. Capsule 13–16 mm long, glabrous. Seeds (immature) 3 mm long, covered with subconic tubercles.

PHENOLOGY.— Flowering: March, July–September; fruiting: December.

HABITATS.— Rain forests, tall forests, moist broadleaf forests; 455–1550 m.

Alta Verapaz: *Johnson 491* (type, see above). **Huehuetenango**: *Garcia et al. 2116* (USCG). **Petén**: *Contreras 6621* (F, LL, MO, S, US). **Quiché**: *Ávila et al. 3058* (USCG).

Gibson (1972, 1974) treated this species under the basionym, *Habracanthus ruberrimus*, and provided an illustration of it. *Stenostephanus ruberrimus* is endemic to Guatemala where it is known from four departments. It is known by at least 10 collections (most of them recent), and was collected as recently as 2006 in Huehuetenango and Quiché.

***Tetramerium nemorum* Brandegee**

RECENT DESCRIPTIONS.— Daniel (1986, 1995b).

PHENOLOGY.— Flowering: November–February; fruiting: November–February.

HABITATS.— Tropical deciduous forest-oak forest transitions, tropical deciduous forests, thornscrub, dry thickets, ravines; 120–1200 m.

Chiquimula: *Véliz & Cobar 13086* (BIGU). **El Progreso**: *Daniel et al. 11214* (BIGU, CAS, K, MICH, MO). **Jutiapa**: *Morales 3542* (USCG). **Retalhuleu:** *Standley 66612* (holotype of *Averia serrata* Leonard: F; isotypes: NY, US). **Zacapa**: *Steyermark 42157* (CAS, F, US).

Gibson (1974) treated this species as *Averia longipes* (Standl.) Leonard, a taxonomic synonym (see Daniel 1986, 1995b).

***Tetramerium nervosum* Nees**

RECENT DESCRIPTIONS.— Daniel (1986, 1995b, 1997b, 1999a), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: August–April; fruiting: August–April.

HABITATS.— Broadleaf forests, tropical deciduous forests, tropical subdeciduous forests, moist thickets, dry thickets, dry and brushy slopes, ravines, disturbed sites (e.g., agricultural lands, roadsides); 120–1500 m.

LOCAL NAME.— "Hierba de coche" (*Molina R. & Molina 26723*)

Alta Verapaz: *Tejada 95* (USCG). **Baja Verapaz**: *Molina R. & Molina 27811* (F). **Chiquimula**: *Molina R. & Molina 25143* (CAS, F). **El Progreso**: *Daniel et al. 11212* (BIGU, CAS, MO). **Escuintla**: *Standley 61324* (F). **Guatemala**: *Standley 89417* (F). **Huehuetenango**: *Molina R. et al. 30173* (F, MO). **Jutiapa**: *Standley 77635* (F). **Quiché**: *Standley 62507* (F). **Zacapa**: *Williams et al. 41869* (F, MO).

Color of corollas among Guatemalan plants varies from yellow to white, with purplish markings on the upper lip.

***Tetramerium tenuissimum* Rose**

RECENT DESCRIPTIONS.— Daniel (1986, 1995b), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: December; fruiting: December.

HABITAT.— Thickets; 150–900 m.

Santa Rosa: *Standley 79509* (F, US).

This species was first noted to occur in Guatemala by Daniel (1986). Although it has not been recollected in the country recently, it likely persists in dry associations. *Tetramerium tenuissimum* is both widespread and sometimes abundant in other portions of its range.

***Thunbergia alata* Bojer ex Sims**

RECENT DESCRIPTIONS.— Daniel (1995b, 1999a), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: January–April, September–October; fruiting: January–April, October.

HABITATS.— Thickets, disturbed sites; 5–1600 m.

Alta Verapaz: *Standley 69462* (F). **Escuintla**: *Standley 63383* (F). **Guatemala**: *Aguilar 362* (F). **Izabal**: *Steyermark 42073* (F, US). **Jutiapa**: *Heyde & Lux 6365* (US). **Petén**: *Lundell 1598* (F). **Quezaltenango**: *Tonduz & Rojas 164* (AGUAT, US). **Quiché**: *Aguilar 870* (F). **Sacatepéquez**: *McCarry 130* (TEX). **San Marcos**: *Steyermark 52312* (F). **Santa Rosa**: *Standley 77786* (F). **Sololá**: *Pöll s.n.* 5 X 1991 (UVAL). **Suchitepéquez**: *Shannon 163* (US).

Gibson (1974) noted that this species, native to Africa, is commonly cultivated and naturalized in some regions. She reported its occurrence in Retalhuleu, but no collections from that department were located during this study. Both yellow- and white-flowered forms have been collected in Guatemala.

Thunbergia fragrans **Roxb.**

RECENT DESCRIPTIONS.— Daniel (1995b), Daniel and Acosta C. (2003).

PHENOLOGY.— Flowering: December–January, April, July; fruiting: January, April, July.

HABITATS.— Disturbed sites (e.g., roadsides, gardens, hedges, fencerows); 5–500 m.

Izabal: *Daniel et al. 11234* (BIGU, CAS). **Petén**: *Aguilar H. 375* (F). **Retalhuleu**: *Steyermark 34519* (F).

Gibson (1974) noted that this species, native to India, is both cultivated and naturalized in Guatemala. The collections cited above represent naturalized occurrences (*Daniel et al. 11234*) or were not specifically noted to have been cultivated (other collections).

Thunbergia grandiflora **Roxb.**

RECENT DESCRIPTION.— Daniel (1995b).

PHENOLOGY.— Flowering: January–February; fruiting: January.

HABITAT.— Disturbed sites; brushy slopes; 72–150 m.

Izabal: *Standley 72204* (F).

Gibson (1974) noted that this species, native to Asia, is somewhat commonly cultivated in Guatemala and rarely becomes naturalized there. Standley's collection from near Quiriguá in Izabal indicated that plants were cultivated and naturalized on a brushy slope. The very similar eastern Asian species, *T. laurifolia* Lindl., is cultivated in Guatemala. It differs by its narrower (2.3–3.5 × longer than wide) leaf blades that have only three major veins, a rounded to subcuneate base, and an entire to subsinuate margin.

EXCLUDED SPECIES

Hemigraphis alternata (Burm. f.) T. Anders. This cultivated species has been reported as an escape in Belize, but not in Guatemala (where it is likely cultivated).

Justicia barbata Bertol. Gibson (1974) indicated that the description of this species was suggestive of *J. breviflora*. An image of the type at BOLO reveals a plant that likely does not pertain to Acanthaceae, but rather to *Lamorouxia* or a similar genus of Scrophulariaceae.

Justicia corymbulosa Bertol. According to Gibson (1974) this is a synonym of *Odontonema callistachyum*. Gibson's concept of that species was very broad and several species she treated as conspecific with it are now recognized as distinct. Among these (e.g., *O. callistachyum*, *O. cuspidatum*, *O. tubaeforme*, and *O. steyermarkii*) it remains uncertain to which species this name applies. Based on an image of the type, it appears much like *O. steyermarkii* (e.g., with pecunculate dichasia that are expanded with secondary peduncles).

Justicia ensiflora (Standl.) D.N Gibson. Gibson (1974) included this species from Belize, and Daniel (2005) mistakenly attributed it to Guatemala as well. Although the species likely occurs (or occurred) in Guatemala, I have seen no records substantiating its existence there.

Justicia reptans Sw. Gibson (1974) noted that the Guatemalan specimen attributed to this species (*Steyermark 45813* at F and US) was in poor condition and contained no corollas. Determination of Steyermark's collection was made by Standley; Gibson (1974) stated that the plants indeed appear much like West Indian collections of the species. Examination of Steyermark's specimen (Alta Verapaz: along Río Sebol, to junction with Río Santa Isabel, 125–150 m, 20 Apr 1942) reveals that it is indeed nearly sterile and in poor condition. Collection notes indicate that the plants were "forming large beds on gravelly place along stream and in middle of stream, either submerged by 1–2 ft. of water or on surface of gravel just above level of water." While the plants show some similarities to subaquatic *J. reptans* (endemic to Santo Domingo and Cuba), it also appears similar to both *J. comata* and *J. pectoralis*, both of which are also frequently subaquatic and both of which occur in Guatemala. In the totality of characters present (e.g., vegetative pubescence; bracteoles less than 1 mm long; and calyx 2 mm long with 5 equal lobes), it appears more like *J. comata*. It differs most notably from that species by lacking whorled inflorescence branches. Although a photo of pollen attached to the specimen is labeled as *J. reptans* and shows 2-aperturate grains with the apertures flanked by one row of insulae on each side (much like *J. comata*), it must be questioned whether the grain pertains to the specimen since Gibson had noted that corollas were not present on it. Because she described both corollas and capsules (presumably from West Indian material), the pollen photo probably pertains to a plant other than *Steyermark 45813*.

Stenostephanus glaber (Leonard ex Lundell) T.F. Daniel. Gibson (1974) noted the occurrence of this species, as *Hansteinia glabra* (Leonard) D.N. Gibson, in Guatemala based on *Vaght 301* from Quetzaltenango. This collection is here treated under *S. monolophus*.

Stenostephanus silvaticus (Nees) T.F. Daniel. Gibson (1974; as *Habracanthus silvaticus* Nees) indicated that although this species had not been collected in Guatemala it might be expected to occur there. No Guatemalan collections of this rather common and widely distributed (Mexico to Panama) species have been located in the years since Gibson's account. Several plants labeled with synonyms of this name are referable to other species. It remains very likely that it will be located eventually in moist to wet montane forests of Guatemala.

Thunbergia erecta (Benth.) T. Anders. This cultivated species was listed by Gibson (1974); it is not known to be naturalized in Guatemala.

ACKNOWLDEGMENTS

My field and herbarium studies of Guatemalan Acanthaceae were funded by grants from the National Geographic Society (Research Award 8570-08) and the National Science Foundation (DEB-0743273). I am grateful for the assistance received at herbaria in Guatemala (AGUAT, BIGU, USCG, and UVAL) and for various courtesies extended by herbaria elsewhere (A, BM, CAS, DS, DUKE, F, G, GH, HAJB, K, L, LL, M, MO, MICH, NY, P, PH, POM, RSA, S, TEX, UC, UPS, US). My studies in Guatemala were facilitated by Mario Véliz (BIGU), who provided inspiration and guidance for these studies, and participated in most of the field work. In addition, I thank the following individuals for their assistance: F. Archila, F. Barreno, A.R. Barrios, O. Calderón, J. Can, J. Castillo, E. Coc, O. Lopez, A.-L. de MacVean, A. Maza, C. Monroy, G. Ocampo, T. Quedensley, A. Rodas, and E. Tiul. Scott Serata assisted with SEM studies, and Sara Adler, Beatriz Mendoza, and Amy Whitesides skillfully prepared the line drawings. Lastly, I do want to thank Dr. Michele Aldrich whose careful perusal of page proof turned up several unresolved problems that had been missed in previous readings.

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Appendix I

Taxonomic Placement of Genera of Acanthaceae Native to Guatemala

Phylogenetic relationships among the subfamilies and tribes can be summarized as follows: Nelsonioideae [{Thunbergioideae + *Avicennia*}{Acantheae(Barlerieae(Justicieae + Ruellieae))}]. Although analyses reveal *Avicennia* to be nested among Acanthaceae, its precise placement has yet to be determined. Inclusion as sister to genera of Thunbergioideae is likely, but possible placement as distinct from that subfamily and sister to Acanthoideae has not been rejected (McDade et al. 2008).

Subfamily Acanthoideae

Tribe Acantheae

Aphelandra, *Stenandrium*

Tribe Barlerieae

Barleria, *Lepidagathis*

Tribe Justicieae

Carlowrightia, *Chileranthemum*, *Dicliptera*, *Henrya*, *Justicia*, *Odontonema*, *Poikilacanthus*, *Pseuderanthemum*, *Razisea*, *Schaueria*, *Spathacanthus*, *Stenostephanus*, *Tetramerium*

Tribe Ruellieae

Bravaisia, *Dyschoriste*, *Hygrophila*, *Louteridium*, *Ruellia*

Subfamily Nelsonioideae

Elytraria

Subfamily Thunbergioideae

Avicennia, *Mendoncia*

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